REVISED WESTSIDE PROJECT ENVIRONMENTAL ASSESSMENT

EA Number OR-118-05-021
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United States Department of the Interior
Bureau of Land Management
Medford District
Glendale Resource Area

Lead Agency: Bureau of Land Management

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Abstract:

This environmental assessment discloses the predicted environmental effects of three alternatives. The Proposed Action includes harvesting timber on approximately 3,374 acres of matrix land with the general prescription of modified even-aged silvicultural methods. Associated activities include approximately 72 acres of tractor and 87 acres of cable yarding corridors; 21 acres of helicopter yarding and the renovation of up to 20 acres of helicopter landings; 93 miles of maintenance work of existing roads, 6.3 miles of temporary road construction, 0.5 mile of permanent road construction, 2.4 miles of road reconstruction, 0.7 mile of existing road decommissioning, the expansion of four rock quarries, a one time stream crossing, and the replacement of one existing bridge. Approximately 988 acres of vegetative fuels would be treated by slashing and prescribed burning. Slash material within 300 feet of roads would be considered for biomass utilization. A proposed stewardship contract would thin 12 acres within an experimental tree plantation (progeny test site) remove 1,000 feet of wildlife fencing and cut trees infected with the Armillaria root rot.

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FINDING OF NO SIGNIFICANT IMPACT

Based upon review of the EA (Environmental Assessment #OR-118-05-021) and supporting project record, I have determined that Alternative 2 (Proposed Action) and Alternative 3 are not a major federal action and would not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27. Therefore, an environmental impact statement is not needed. This finding is based on the following discussion:

Context. The Alternatives are site-specific actions directly involving approximately 4,362 acres of BLM (Bureau of Land Management) administered land that by itself does not have international, national, region-wide, or state-wide importance. The Action Alternatives are located within the matrix and riparian reserve land use allocations and within the boundaries of the 6th field Hydrologic Unit Condition (HUC 6) boundaries of the Windy Creek, Cow Creek Fortune Branch and Cow Creek Quines Creek sub-watersheds.

The discussion of the significance criteria that follows applies to the intended actions and is within the context of local importance. Chapter 3 of the EA details the effects of the Alternatives. None of the effects identified, including direct, indirect and cumulative effects, are considered to be significant and do not exceed those effects described in the *Medford District Resource Management Plan/Final Environmental Impact Statement* (June 1995).

Intensity. The following discussion is organized around the Ten Significance Criteria described in 40 CFR 1508.27. The impacts of Alternative 2, Alternative 3 and the two Mitigation Measures are compared in Table 2-2 (Summary of Consequences) of the Westside EA.

1. Impacts may be both beneficial and adverse. The predicted environmental effects of the Action Alternatives and Mitigation Measures, most noteworthy, include:

a) social and economic benefits by providing a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability;

b) short term effect of commercial thinning treatments might be an increased fire hazard on 1,859 acres under Alternative 2 and 1,671 acres under Alternative 3 due to the presence of slash on site. There would be a short term cumulative effect increase in fire hazard due to implementing the commercial thinning prescriptions on approximately 3,095 acres (including proposed treatments in the separate Middle Cow Creek Late Successional Reserve Project) under Alternative 2 and 2,907 acres under Alternative 3. This increase is considered short term until the slash is mitigated which generally occurs within six months to two years after the harvest activity takes place. Although hazardous fuel treatments and regeneration harvest activities also produce slash, this does not necessarily result in increased fire behavior, in terms of flame length, compared to the current conditions of the stands proposed for these treatments. The action alternatives propose 988 acres of hazardous fuel treatments in the Westside Planning Area. The Middle Cow LSR project proposes similar treatments on approximately 2,501 acres and approximately 250 acres of fuel treatments have already been implemented within the fire analysis area since implementation of the National Fire Plan in 2000. The cumulative effect of these combined activities may be a long term decrease in fire hazard on approximately 3,740 acres under either action alternative. The long term cumulative effect would be a decrease in fire hazard on approximately 3,489 acres of hazardous fuel treatment units under either action alternative. Conversely, the fire hazard is expected to increase in the long term due to the trends discussed in the current conditions section and the continued exclusion of fire on up to 8,099 acres under the No Action Alternatives of Westside and Middle Cow Creek Late Successional Reserve Project. Also, there are no expected direct, indirect, or cumulative effects on fire risk under any of the alternatives (see fire effects analysis in Chapter 3);

c) Alternative 2 would result in soil compaction and top soil erosion that would reduce localized areas of soil productivity. The incremental effects of disturbance from yarding corridors, roads, landings, and quarries would cause up to 176 acres (0.5%) of compaction, and productivity losses equaling the equivalent of up to 141 acres (0.4%) within the Planning Area. Baseline compaction within these watersheds, discussed in the affected environment previously, is 4.4% (690 ac) of Windy Creek HUC 6 sub-watershed, 4.1% (570 ac) in Fortune Branch HUC 6 sub-watershed is compacted, and 4.2% (755 ac) of Quines Creek HUC 6 sub-watershed. Under Alternative 2 this project would add less than 1% compaction in all watersheds, thus compaction would remain well below the maximum 12% compaction standard at the Planning Area level. (RMP, p. 166). Because BMPs and project design features such as maximum skid trail widths, 150 foot separation requirement for skid trails, and seasonal restrictions would be implemented, compaction would also remain below 12% at the harvest unit scale. Productivity loss from past harvest and road construction within these sub-watersheds is approximated to be 3.5% (550 ac) in Windy Creek, 3.4% (480 ac) in Fortune Branch, and 3.5% (632 ac) in Quines Creek. Under Alternative 2 productivity losses in Windy Creek HUC 6 would be approximately 0.3% for a total of about a 3.8%, in Fortune Branch HUC 6 approximately 0.6% for a total of 4%, and in Quines Creek HUC 6 sub-watershed about 0.04% for a total of 3.54%. Therefore under this alternative, productivity losses would not exceed 5% (RMP/EIS p. 4-13) within the Planning Area and within each harvest unit.

d) approximately 9 culverts (non fish bearing) are proposed for replacement and one bridge replacement over fish habitat in Windy Creek. The road maintenance, reconstruction and hauling are proposed for roads which cross intermittent, perennial, and fish bearing streams. Some of these roads also parallel fish bearing streams in some spots as close as 30 feet. Because of the close proximity of the road related activities (excluding new road construction) sediment would reach fish habitat. This sediment would be expected to be seen in fish habitat during the first winter. Because of the

Project Design Features (PDF), which include the Best Management Practices (BMP) within the RMP, the amount of sediment reaching fish habitat from road related activities would be minimal. The amount entering fish habitat would not cause turbidity to the point of disrupting fish behavior. Such behavior during the first winter when sediment would be entering fish habitat would include spawning, juvenile rearing, and juvenile feeding. The amount of sediment would not cause a reduction in macroinvertebrates, which are a food source for fish. Sediment input would not cause a detectable change in fish habitat. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering fish habitat would decrease to the point of being immeasurable. Because of the above explanation the proposed road activities would not contribute to the need to list the Bureau sensitive Oregon Coast coho or Oregon Coast winter steelhead.

Alternative 2 proposes creating additional open space within the Wood Creek HUC 7. The creation of additional open space when combined with the existing condition within this HUC 7 increases the potential of an increase in peak flows occurring. Depending on the magnitude of the increase in peak flow, there is a potential for the increase in peak flow to negatively effect fish habitat. The channel erosion and increased sediment would not however, substantially alter fish habitat within Wood Creek rather the effect would be a minor reduction in quality of fish habitat. The increased peak flows would result in localized effects of in-channel erosion. Even in light of a potential minor reduction in quality of fish habitat, sufficient fish habitat within this HUC 7 would remain available under Alternative 2 for fish to carry out life cycles. In addition, there are no regeneration or overstory reduction units adjacent to fish habitat in Wood Creek. The Bureau sensitive species found within Wood Creek include Oregon Coast coho and Oregon Coast winter steelhead. The Action Alternatives s within Wood Creek would not cause a reduction in population within the ESUs or the smaller populations of Oregon Coast coho or Oregon Coast winter steelhead because sufficient quantity and quality of habitat would remain in Wood Creek for coho and steelhead to utilize. Therefore the effects to habitat used by these species would not be expected to contribute to the need to list these species under the Endangered Species Act. The factors which led to this conclusion include 1) the minor reduction of quality of fish habitat, 2) the localized effects of in stream erosion, and 3) the small scale of the effects. The effects would be measurable at the HUC 7 scale but not at a HUC 6 or HUC 5 scale;

f) essential fish habitat (EFH) for Chinook and coho salmon were also considered in light of Wood Creek. Potential channel erosion would not substantially alter EFH within Wood Creek. The effect would be a minimal reduction in quality of EFH. The increased peak flows could potentially result in localized effects of in-channel erosion. These small sediment depositions within habitat units (pools, riffles, etc.) would not remove the ability of fish to use those habitat units for carrying out activities such as spawning, rearing or holding. Even in light of a potential minor reduction in quality of EFH, sufficient EFH within Wood Creek would remain available under Alternative 2 for fish to carry out life cycles. Approximately 9 culverts (non fish bearing) are proposed for replacement and one bridge replacement over fish habitat in Windy Creek. The road maintenance, reconstruction and hauling are proposed for roads which cross intermittent, perennial, and EFH. Some of these roads also parallel EFH in some spots as close as 30 feet. Because of the close proximity of the road related activities (excluding new road construction) sediment would reach EFH. There is an expected localized, minimal, short term increase in sediment which would affect EFH during the first winter. PDFs would mitigate sediment at the site level following the first winter. It is during the first winter rain storms in which most of the exposed soil from road maintenance is mobilized, transported down the ditches and enters stream channels. In addition, road maintenance and decommissioning would reduce chronic erosion problems and have the overall effect of reduced input of sediment to streams;

g) See effects to ESA threatened and endangered species in criteria # 9 below.

None of the environmental effects disclosed above and discussed in detail in Chapter 3 of the EA are considered significant.

2. The degree to which the selected alternative will affect public health or safety.
Public health and safety would not be affected. The Action Alternatives are comparable to other timber harvest projects which have occurred within the Glendale Resource Area with no unusual health or safety concerns. Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 32 public responses from either letters or emails. Responses to public scoping comments are found in Appendix 3. Comments were also considered in the development of the alternatives. No public health or safety risks were identified in those comments.

Activity and hazardous fuels would be burned in accordance with the Oregon Smoke Management Plan administered by the Oregon Department of Forestry and the regulations established by the Oregon Department of Environmental Quality. The Planning Area is not located within a Class I designated airshed or non-attainment area. The impact of smoke on air quality is expected to be localized and of short duration. Particulate matter would not be of a magnitude to harm human health, affect the environment, or result in property damage. The general policy for prescribed burning on the Medford District is to notify residents prior to seasonal burning through news releases. Residents who have contacted the Glendale Resource Area with specific smoke sensitive health issues would be contacted prior to ignition in the general area. No residents have contacted the Glendale Resource Area regarding the Westside Project. Dust created from vehicle traffic on gravel or natural-surfaced roads, road construction, and logging operations would be localized and of short duration. As such, the Action Alternatives are consistent with the provisions of the Federal Clean Air Act.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wild and scenic rivers, or ecologically critical areas. There are no, prime farm lands, wetlands, wild and scenic rivers or wildernesses located within the Planning Area. Cultural surveys were completed for the Westside Planning Area. All recorded known sites under all proposed activities would be protected using Project Design Features such as a no cut buffer. As such, cultural resources would not be affected. If cultural resources are located during the implementation of an action, the project would be redesigned to protect the values present.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial. The effects of the Action Alternatives on the quality of the human environment are adequately understood by the interdisciplinary team to provide analysis for the decision. The 32 public comment letters or e-mails were analyzed by the Westside interdisciplinary team and the BLM responded fully to those comments under Appendix 3 of the EA. While comments, such as other scientific research, were mentioned by the public, the actions of the Westside alternatives are within those identified in the RMP and the predicted effects are contained in Chapter 3 of the EA. BLM fully responded to these comments in Appendix 3 and none of the comments were considered controversial in respect to their context and intensity in determining significance.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks. The Action Alternatives are not unique or unusual. The BLM has experience implementing similar actions in similar areas and have found effects to be reasonably predictable. The environmental effects to the human environment are fully analyzed in Chapter 3 of the EA. There are no predicted effects on the human environment which are considered to be highly uncertain or involve unique or unknown risks. The Westside Project conducted a public meeting for local residents and received 32 letters of comments. The Westside interdisciplinary team analyzed those comments and the responses are found in Appendix 3. No unique or unknown risks were identified in those comments.

6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** The Action Alternatives do not set a precedent for future actions that might have significant effects nor does it represent a decision in principle about future consideration. The Action Alternatives would occur within the matrix and riparian reserve land allocation and Chapter 1 of the Westside EA identifies the Proposed Action and how they are consistent with the Purpose and Need and compliance with higher level EIS documents. Chapter 3 evaluates the effects of the alternatives and the findings are that all projects proposed would be compliant with the effects anticipated under the Medford RMP. Any future projects would be evaluated through the NEPA (National Environmental Policy Act) process and would stand on their own as to environmental effects.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.** The interdisciplinary team evaluated the Action Alternatives in context of past, present and reasonably foreseeable actions. Significant cumulative effects outside those already disclosed in the *Medford District Resource Management Plan/Final Environmental Impact Statement* are not predicted. A complete disclosure of the effects of the Action Alternatives is contained in Chapter 3 of the EA.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources. The Action Alternatives would not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor would the Action Alternatives cause loss or destruction of significant scientific, cultural, or historical resources.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973. The Action Alternatives would not negatively affect Endangered Species Act (ESA) listed Southern Oregon/Northern California (SO/NC) coho salmon (Threatened). SO/NC coho salmon are not located within the Planning Area but road maintenance and haul would occur within the Rogue River Basin, in which SO/NC coho salmon are found. The 6.2 miles of road maintenance and haul proposed within the Rogue River Basin would have no effect on SO/NC coho salmon or coho critical habitat (CCH). The closest perennial stream crossing from coho is more than 0.4 miles away. With well vegetated ditch lines, properly functioning cross drains, and existing filter strips, sediment has no mechanism for delivery to coho streams or CCH.

Harvesting would affect northern spotted owl suitable habitat and the effects were analyzed in the Medford Resource Management Plan/Environmental Impact Statement (RMP/EIS). The cumulative effect of harvesting from private lands and the Action Alternatives are less than what was anticipated in the RMP/ROD. The cumulative removal and downgrading of suitable habitat from the Action Alternatives, combined with other foreseeable projects, for example Middle Cow Creek LSR and Boney Skull, is less than 13% of the current suitable habitat in this Section 7 watershed. The BA (RORSISBLM FY 06-08 BA) states that no more than 18 percent of the suitable habitat would be removed from any Section 7 Watershed and that reduction was anticipated in the NFP. Cumulative effects on the spotted owl sites in the Planning Area affected by the Action Alternatives are not expected to change the stable population trend in the Klamath Province.

Harvesting would affect northern spotted owl critical habitat and the effects were analyzed in the Medford Resource Management Plan/Environmental Impact Statement (RMP/EIS). The Action Alternatives would result in removal or downgrade of less than 1,019 acres of current CHU suitable habitat. The BA (RORSISBLM FY 06-08, p. BA-49) states that it has anticipated the removal or downgrade of up to 4, 442 acres of suitable habitat from all CHUs over the next three years. The Westside Project is included in this prediction. The BLM has initiated consultation with the U.S. Fish and Wildlife Service on the Westside Project. The actions would be implemented in accordance with Terms and Conditions of the Biological Opinion.

The Action Alternatives are unlikely to impact fishers because they are not suspected to occur in the area. Due to the small size and isolation of late-successional forest units from previous harvesting on BLM matrix and private lands within the Middle Cow Creek watershed, it is possible that it may no longer be suitable for resident fishers. The largest late-successional blocks are expected to continue be restricted to LSRs. With the cumulative effects of private harvesting, low BLM ownership and few large patches of BLM late-successional habitat at low elevations, combined with the fisher's natural rareness and slow re-colonization rates of restored habitats, the species is not expected to be well distributed throughout its range (USDA/USDI 1994a, pp. 53, 470). The Action Alternatives would not change the assessment predicted in the NFP.

10. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.** The Action Alternatives do not violate any known federal, state, or local law or requirement imposed for the protection of the environment. Furthermore, the Action Alternatives are consistent with applicable land management plans, policies, and programs in section 1.5 of the EA.

Chapter 1.0 What Action is Proposed and Why?

1.1 Introduction

This environmental assessment (EA) will analyze the impacts of proposed forest management activities on the human environment in the Westside Planning Area (PA). The EA will provide the decision maker, the Glendale Field Manager, with current information to aid in the decision making process. It will also determine if there are significant impacts not already analyzed in the Environmental Impact Statement for the Medford District's Resource Management Plan and whether a supplement to that Environmental Impact Statement is needed or if a Finding of No Additional Significant Impact is appropriate.

Chapter 1 provides a context for what will be analyzed in the EA, describes the kinds of action that will be considered, defines the PA, describes what the proposed actions need to accomplish, and identifies the criteria that will be used for choosing the alternative that will best meet the purpose and need for this proposal.

The analysis utilizes field data, ground verification by resource specialists and Geographical Information System (GIS) technology to estimate acres, road miles and produce reference maps. Estimates are intended to aid the reader in understanding the proposed actions. The reader should be aware that electronic technology can produce information that appears precise but is still dependent on further field work. During implementation, unit boundaries are posted and surveyed and unforeseen features, such as water sources, are appropriately buffered. It has been the experience for past Glendale Resource Area environmental assessments that estimates of treatment acres in the EA have been generally more than the actual acres treated on the ground.

1.2 Proposed Action

The Proposed Action (Alternative 2) includes harvesting timber on approximately 3,374 acres of forest land by the general prescription of modified even-aged silvicultural methods. Cut trees would be removed by the use of tractor, skyline cable or helicopter yarding methods. This would include approximately 72 acres of tractor yarding corridors, 87 acres of cable yarding corridors, 21 acres of helicopter yarding and the renovation of up to 20 acres of helicopter landings. To facilitate the transport of logs there would be approximately 93 miles of road maintenance, 6.3 miles of temporary road construction, 0.5 mile of permanent road construction, 2.4 miles of road reconstruction, 0.7 mile of existing road decommissioning, the expansion of four rock quarries and the replacement of one existing bridge. There would be a stream channel crossing of two pieces of equipment to access unit 17-c one time and then exit one time after harvest using a pre-designed log, natural bottom or mat ford. The streambanks would also be stabilized and built up to redirect flow back into the historic channel. An existing in-stream culvert would be replaced downstream of this unit on road 32-5-17, sized to accommodate the additional flow that would occur within this channel as a result of redirecting the natural flows back into the channel

Residual limbs and branches left on the ground after harvesting would be treated by either slashing, hand-piling, pile-burning, underburning, and/or lop-and-scatter methods to reduce the fuel loading and to prepare the site for planting of conifer seedlings. Units would be planted, where necessary, to ensure adequate stocking as required by the Federal Land Policy and Management Act (FLPMA).

One stewardship contracting project is proposed within the Westside Planning Area. Stewardship involves the packaging of commercial harvesting to fund needed service work. Service work for this project includes maintaining an existing experimental tree plantation (progeny test site) by thinning 12 acres and removing 1,000 feet of wildlife fencing, cutting trees infected with the Armillaria root rot and thinning, piling and burning small diameter vegetation for hazardous fuels reduction.

Approximately 988 acres of overstocked vegetation would be treated by a combination of treatments that include slashing and prescribed burning. Riparian fuels reduction would occur up to 25 feet of the stream bankfull width. Biomass utilization would manually remove slashed woody material within 300 feet of roads created from fuels treatments.

The majority of the harvest units are within lands governed by the O & C (Oregon and California) Lands Act. Eleven harvest units are within Public Domain Lands. Harvesting and associated forest management activities are planned to occur between 2006 until 2012. BLM planning decisions and harvest activities would apply only to BLM-administered O & C and Public Domain lands.

1.3 Project Location

The PA is located north of the community of Glendale, south of Canyon Creek Pass and immediately northwest and southeast of Interstate 5 (Vicinity Map). The PA is contained within the boundaries of the Hydrologic Unit Condition (HUC) 6 boundaries of the Windy Creek, Cow Creek Fortune Branch and Cow Creek Quines Creek sub-watersheds, which flow into the larger 113,000 acre Middle Cow Creek HUC 5 watershed.

The BLM manages approximately 9,120 acres of the 33,046 acre PA, which is a checkerboard pattern of public and private ownerships. Of the 9,120 acres of BLM lands, approximately 8,560 acres are O & C Lands, and the remaining 960 acres are Public Domain Lands governed by FLPMA. The legal description of the PA is Township (T) 32 S, Range (R) 5 W, Sections 2-11,14-22, 29-33; T. 32 S, R. 6W, Sections 1-5,8-17,20-29, 33-36; T. 33 S, R. 5W, Sections 4-6; T. 33 S. R. 6W, Sections 1-4, 9-10 and T. 31 S, R. 5 W, Sections 30-32, Douglas County, Willamette Meridian.

The Planning Area includes the land allocations of matrix and riparian reserves. The Medford District Record of Decision and Resource Management Plan (ROD/RMP) has allocated approximately 22 percent of the Medford District's landbase to the matrix land use allocation (RMP, p. 72). Matrix lands within the Westside Planning Area are separated into northern General Forest Management Areas (NGFMA) and Connectivity/Diversity Blocks. Connectivity/Diversity Blocks vary in size and are distributed throughout the NGFMA. Riparian reserves occur across all land use allocations and estimated to include 43% of the landbase. This percentage is based on prescribed riparian reserve widths and estimated miles of streams within all of the various land use allocations.

1.4 Purpose and Need for the Proposal

1.4.1 Need for Action

The BLM has a statutory obligation under FLPMA which directs that "[t]he Secretary shall manage the public lands . . . in accordance with the land use plans developed by him under section 202 of this Act when they are available . . ." The Medford District's Record of Decision and Resource Management Plan (ROD/RMP, June 1995) guides and directs management on BLM lands.

One of the primary objectives identified in the RMP is implementing the O & C Lands Act which requires the Secretary of the Interior to manage O&C lands for permanent forest production in accord with sustained yield principles (ROD/RMP, p.17).

For sustained yield the Medford ROD/RMP assumed an average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP, p. 9). However, the actual amount offered for sale on the Medford District from 1995 to 2004 fell far below this amount, as it was less than 500 acres of regeneration harvest and overstory removal per year. The RMP identified regeneration and overstory removal as the primary method of harvest on NGFMA lands (RMP, p 187). Commercial thinning is not a sustainable method of harvest but produces timber and is appropriate where stands are overstocked and to assure high levels of volume productivity.

The need for harvest treatments in the Westside Planning Area is to meet the NGFMA direction in the Medford RMP/ROD of providing a sustainable supply of timber that would trend toward a forest composed of stands representing a variety of structures, ages, sizes, and canopy configurations generally through the even-aged management silvicultural system (ROD/RMP, p. 187). Where appropriate the modified regeneration silvicultural treatments would occur at a minimum 100 years of age (ROD/RMP, p. 74).

The Middle Cow Creek Watershed Analysis (WA, p. 35) estimated that 58% of NGFMA lands within this area are mature and older stands. Approximately 39% of the older stands are over 200 years of age. Individual stands currently have an all aged structure developed as a result of past disturbances such as natural fire or partial cut harvesting. The desired landscape on NGFMA lands within the Westside Planning Area is a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66).

Diseased trees need to be removed where they pose a risk to infecting adjacent trees important to riparian habitat or timber resource values. Wildland-Urban Interface (WUI) areas occur where homes and other structures are adjacent to natural or undeveloped areas. The proximity of these structures to wildland fuels make them susceptible to wildfire. The Westside Planning Area resides completely within the WUI area as defined by the U.S. Forest Service, the BLM, and the Oregon Department of Forestry. Also, the Fortune Branch Community Wildfire Protection Plan (CWPP) is within the Planning Area. WUI and CWPP areas are identified as high priority treatment areas to mitigate the existing fire hazard and minimize the threat of wildfire to rural communities.

Stewardship projects are a means to achieve land management goals and meet local and rural community needs (USDI BLM IM No. 2004-081, 1-15-04). In the face of declining fiscal and personnel resources, government agencies are emphasizing the construction of "cooperative ventures between two or more parties who leverage resources to accomplish a mutually beneficial project …" (Oregon/Washington BLM Partnership Strategy 7/04). The need for commercial harvesting on young stands and the need to accomplish forest management can utilize stewardship projects as a method to pay for fuels projects, fence removal and road work.

1.4.2 Purpose (Objectives) for Action

Any action alternative to be given serious consideration as a reasonable alternative must meet the objectives provided in the RMP for projects to be implemented in the Planning Area. The RMP and statutes specify the following objectives to be accomplished in managing the lands in the Planning Area:

1. Produce a sustainable supply of timber and other forest commodities on matrix lands to provide jobs and contribute to community stability (RMP, p. 38) by:

    - applying modified regeneration silvicultural treatments at a minimum of 100 years of age (RMP, p. 74). This age level is sustainable and would meet economic and logging-practicality requirements. Over time rotation lengths would approach the age of culmination of mean annual increment (CMAI). For most regimes and sites in southwestern Oregon, CMAI occurs near 100 years of age (RMP, p.181). In order to manage these lands in accordance with the principle of sustained yield, stands which exceed the minimum harvest age are due for harvest designed for regeneration of a new stand of timber.

      The Middle Cow Creek Watershed Analysis noted that the long-term landscape design would be a "mosaic of stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions" (p. 66);

- applying commercial thinnings would be designed to assure high levels of volume productivity in stands less than 120 years of age (RMP, p. 189).

2. Reduce both natural and activity based fuel hazards through methods such as prescribed burning, mechanical or manual manipulation of forest vegetation and debris, removal of forest vegetation and debris, and combinations of these methods (RMP, p. 91).

3. Manage riparian reserves to restore and maintain the ecological health of watersheds and aquatic ecosystems by

   - controlling stocking, re-establish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy and riparian reserve objectives (RMP, p. 27);

   - closing and stabilizing roads based on the ongoing and potential effects to Aquatic Conservation Strategy and riparian reserve objectives and considering short-term and long-term transportation needs (RMP, p. 28);

   - designing prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy and riparian reserve objectives (RMP, p. 30).

1.4.3 Decision Factors

In choosing the alternative that best meets the purpose and need, the Glendale Field Manager would evaluate alternatives on:

- silvicultural systems that are sustainable, economically practical, and capable of maintaining the long-term health and productivity of the forest ecosystem;

- providing timber resources and revenue to the government from the sale of those resources;

- providing for the establishment and growth of conifer species while retaining structural and habitat components, such as large trees, snags, and coarse woody debris;
- reducing both natural and activity based fuel hazards.

1.5 Plan Conformance

This Proposed Action conforms to the:

- *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (Northwest Forest Plan FSEIS, 1994 and ROD, 1994);
- *Final-Medford District Proposed Resource Management Plan/Environmental Impact Statement* and *Record of Decision* (EIS, 1994 and RMP/ROD, 1995);
- *Final Supplemental Environmental Impact Statement: Management of Port-Orford-Cedar in Southwest Oregon* (FSEIS, 2004 and ROD, 2004);
- *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and* Guidelines (FSEIS, 2000 and ROD, 2001) and amendments or modifications as of March 21, 2004;
- *Final Supplemental Environmental Impact Statement Clarification of Language in the 1994 Record of Decision for the Northwest Forest Plan National Forests and Bureau of Land Management Districts Within the Range of the Northern Spotted Owl and Proposal to Amend Wording About the Aquatic Conservation Strategy* (FSEIS, 2003 and ROD, 2004).
- *Medford District Integrated Weed Management Plan Environmental Assessment (1998*) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS, 1985).

The *Middle Cow Creek Watershed Analysis* and *Grave Creek Watershed Analysis are* incorporated by reference. Watershed analysis is an analytical process and not a decision-making process as provided in the Record of Decision for the Northwest Forest Plan (p. B-20).

The Medford District is aware of ongoing litigation <u>Pacific Coast Federation of Fishermen's Associations et al. v. National Marine Fisheries Service et al. (W.D. Wash.)</u> related to the 2004 supplemental environmental impact statement for the Aquatic Conservation Strategy (ACS). The Magistrate Judge issued findings and recommendations to the court on March 29, 2006. The court has not found this amendment to be "illegal," nor did the Magistrate recommend such a finding. Given the court has not yet adopted the findings and recommendations, the BLM will appropriately continue to follow the current direction in the 2004 ROD, until ordered otherwise. The Westside environmental analysis tiers to this document as the clarification of how to address the ACS. Since it was only a clarification, and did not alter any of the on-the-ground components of the standards and guidelines designed for achieving the ACS objectives, whether the court upholds the amendment or not should have little practical effect at the project level.

1.6 Permits and Approvals Required

The following permits and approvals are required prior to project implementation:

- license agreements and/or other authorization with adjacent landowners to have a third party haul timber and use of landings;
- in compliance with the Oregon Smoke Management Plan, prescribed burning activities on the Medford District require pre-burn registration of all prescribed burn locations with the Oregon State Forester.

1.7 Scoping and Alternative Use of Resources

1.7.1 Public Scoping

Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 32 public responses from either letters or emails and are fully responded to in Appendix 3 of this EA. Comments were considered in the development of the alternatives. The Glendale Resource Area also accepts public comment of proposed forest management activities through the quarterly BLM Medford Messenger publication. A brief description of proposed projects, such as Westside, a legal location and general vicinity map are provided along with a comment sheet for public responses. The Westside Project was included in these quarterly publications beginning in fall, 2004.

1.7.2 Alternative Use of Resources

Conflicts with the Proposed Action were considered and identified in Appendix 1 and were analyzed to determine if an alternative action would be developed. Appendix 1 also explains why some alternatives were considered but not analyzed in detail and eliminated from further study.

1.8 Decisions to be Made

The Glendale Field Manager is the official responsible for deciding whether or not to prepare an Environmental Impact Statement (EIS), and whether to approve the treatments as proposed, not at all, or to some other extent.

It is anticipated that one decision document would be prepared for timber harvesting on up to five timber sales; one decision document would be prepared for hazardous fuels treatments; and one decision document for stewardship projects.

Chapter 2.0 Alternative Ways of Accomplishing the Objectives

2.1 Introduction

This chapter presents the alternative ways of meeting the project objectives identified in Chapter 1, by describing and comparing the alternatives, including Alternative 1 (No Action Alternative) and the two action alternatives, Alternative 2 (Proposed Action) and Alternative 3 as specified in 40 CFR (Code of Federal Regulations) § 1502.14. Descriptions summarize potential environmental consequences and focus on potential actions and outputs. Project Design Features were identified and are included here to ensure project compliance with higher-level National Environmental Policy Act (NEPA) documents, laws and BLM guidelines.

Through the scoping process, the public provided comments that were considered by the interdisciplinary team and BLM responses are found in Appendix 3 (Public Comment to Westside Landscape Planning Project Scoping Report and BLM Response). There was one unresolved conflict concerning alternative uses of available resources identified by the interdisciplinary team. This conflict included the potential increased water flow in the transient snow zone from regeneration harvesting. This led to the development of Alternative 3 (see **Appendix 1 for discussion**). As such, the alternatives that will be analyzed in detail in this EA include the No Action Alternative, the Proposed Action Alternative and Alternative 3. Two mitigation actions are evaluated in response to: current litigation on activities within northern spotted owl critical habitat and seasonal helicopter noise disturbance to the adjacent Fir Point Bible Conferences private land.

2.2 Proposed Projects

2.2.1 Description of Forest Management Treatments

Regeneration Harvest (RH). *This modified even-aged harvest method would open a forest stand to the point where favored tree species would be established (RMP/ROD, p. 111).*

To maximize volume growth and yield, regeneration harvesting would occur on mature stands trees over 100 years of age and replaced with vigorous growing younger stands to provide commercial timber while retaining a component of snags, down wood, hardwoods, and overstory legacy trees.

Within northern (GFMA) General Forest Management Areas, at least 6-8 green conifer trees per acre would be retained. These conifer trees would be selected proportional to the existing species composition and equally across all 20"+ diameter classes present. One to two additional conifer trees per acre would be retained to ensure meeting coarse woody debris guidelines. Large hardwood trees would be retained with an objective of leaving 2-5 trees per acre (RMP, p. 188). For stands within Connectivity/Diversity blocks, 25-30 percent of each block would be maintained in late-successional forest condition and 12-18 green conifer trees per acre would be retained (RMP. p. 40). The RH units would be burned, if necessary, to prepare the site and then planted.

Overstory Removal (OR). *A form of the regeneration harvest method. Harvesting occurs as the final stage of cutting where the remaining overstory trees are removed to allow the understory to grow (RMP/ROD, p. 110).*

One of the objectives of this treatment is to replace existing older mature stands with ones of vigorous growing younger stands of conifers. This method is appropriate where there are two distinct canopy layers of a mature overstory component and a younger vigorous understory. This condition was developed through natural processes such as fire or by earlier harvesting. The other objective emphasizes the retention of healthy existing conifer regeneration after most of the overstory trees are removed. Retained trees would meet the RMP requirement for green tree retention (6-8 trees/acre). An additional 1-2 trees/acre would be retained to meet coarse woody material objectives as well as future snag recruitment. Large hardwood trees would be retained with an objective of leaving 2-5 trees per acre (RMP, p. 188). Existing conifer regeneration would be released by increased light levels and would become part of the next managed stand.

Shelterwood Retention (SW). *A form of the regeneration harvest method. A portion of the overstory trees are retained to protect visual quality or to protect understory conifers from frost (ROD/RMP, p. 113).*

The objective is to remove approximately half of the overstory trees and promote a young vigorously growing stand of conifers in the understory. This treatment is proposed to meet the Visual Resource Management II (VRM II) guidelines for the Interstate 5 corridor as stated in the RMP (page 70). Once the understory grows large enough to be harvested, the stand would be entered again while meeting visual management guidelines of VRM II.

Group Select (GS). The group selection system is an uneven-aged silvicultural system in which small groups approximately one quarter to two acres in size would be periodically harvested and regenerated within a defined stand boundary. This would create a mosaic of age classes scattered within the stand.

Selective Tree Harvest (SC). *Harvesting would generally produce a multiple-canopied, multi-aged stand but not an all aged stand. Individual trees and groups of trees would be removed but the objective is to produce a multi-canopied stand, not a stand of all ages.*

The objective of this treatment is to remove certain species to balance out species composition and trees in a state of decline from the stand. The stand would exhibit a healthier overstory then what is currently there, as well as remove suppressed and poorly formed trees from the understory of the stand. Young, vigorously growing conifers would replace the older decadent trees that were removed. The stand would also exhibit a multi-layered canopy with canopy gaps and areas of no treatment (retention).

Commercial Thinning (CT). *Commercial thinning is the removal of merchantable trees from an even-aged stand to encourage growth of the remaining trees (ROD/RMP, p. 103).*

Commercial thinning is an intermediate treatment prior to regeneration harvest. It is a silvicultural practice generally applied to control stand density, maintain stand vigor, and place or maintain stands on developmental paths so that desired stand characteristics result in the future while providing an entry that is economical (RMP, p. 185). This treatment would promote better stand health, as well as increased vigor and better crown development on retained trees. Fewer, larger trees would make up these stands in the long term and overall stand health would be improved. Production of some wood volume at the present time and an increase/maintenance of growth rates for wood volume production in the future are primary objectives.

Sanitation Harvest. *Trees killed or injured by either fire, insects, disease etc. are removed for the purpose of preventing the spread of insect or disease (ROD/RMP, p. 112).*

The objective of this treatment is to contain and eventually stop an area of Armillaria root rot. Infected trees as well trees adjacent to this outbreak center are to be removed. Resistant planting stock would be planted in this disease area to provide for reforestation of the site. Production of wood volume is not a primary objective of this treatment.

Riparian Thinning. *The objective of riparian thinning treatments is to create a stand that is on a trajectory to reach a late-successional condition.*

Many of these units are dominated by smaller diameter stands of Douglas fir and some hardwoods. Most stands are lacking large wood debris, downed logs, and large tree structure. The treatment would reduce competition on the retained trees for light, nutrients, water and growing space. These trees would develop larger canopies, display better vigor and put on diameter growth faster then if left untreated. Canopy gaps would also be created in these zones to promote multiple-layered stands and promote species diversity that is a key element in late-successional habitat. Production of wood volume is a bi-product of this treatment, but is not a primary objective.

Riparian thinning would be done within riparian reserves adjacent to commercial thinning, pre-commercial thinning, and group select units throughout this Planning Area to improve stand health and species diversity, and to reduce the existing fire hazard. Riparian areas proposed for treatment were selected based on the high density and young age (20-80 years) of the stand, or as a result of existing disease pockets or unnaturally low species diversity. Treatments would occur in accordance with the following prescriptions to ensure protection of streams while restoring stand health.

On all units, a minimum 25 foot no treatment buffer, from bankfull width, would be used to protect streambank stability. Studies have shown that "vegetation immediately adjacent to the stream channel is most important in maintaining bank integrity" (FEMAT 1993). Twenty-five feet is roughly equal to the largest crown width that is generally present on trees occurring within riparian stands that have been chosen for treatment under this project. For Douglas fir trees typical of these stands, crown width generally relates to the extent of the root network (Kocher) that is helping to stabilize the streambanks. In addition to the stabilizing effect of the root network, adjacent trees also dissipate stream energy during high or overbank flows, further reducing bank erosion (FEMAT 1993).

Where treatments occur between 25-60 feet of the stream, angular canopy density would remain close to existing levels to protect stream shading. A 60 foot buffer was found to protect nearly all shade characteristics necessary to maintain or improve stream temperatures (NFP Temperature TMDL Implementation Strategies, US Forest Service and BLM, 2005). Understory trees, which are not providing shade, would be treated within this buffer to reduce fire hazard and to improve the vigor of the remaining overstory trees by increasing available growing space, water, and nutrients.

Between 60 and 160 feet wide, measured from the stream channel, a variable width buffer would be used that is based on the Ecological Protection Width Needs chart (ROD, B-15). This chart is based on slope and rock type, and takes into account protection of streams from "surface erosion of streamside slopes, fluvial erosion of the stream channel, soil productivity, habitat for riparian-dependent species, the ability of streams to transmit damage downstream, and the role of streams in the distribution of large wood to downstream fish bearing waters" (B-15, Standards and Guidelines). Within this buffer zone forest health treatments would occur. Canopy closure within this zone would remain above 50%, species diversity would be maintained, and all naturally occurring or felled course and large woody debris would be left on site. These treatments would used to reduce the number of diseased trees within stands, increase stand productivity and diversity, and to reduce fire hazard. No treatments within this zone would use ground disturbing yarding activities to remove logs ors excess biomass. Studies by Emmingham et al (2002) and others have shown a 50% canopy closure is sufficient to maintain microclimate conditions within the riparian zone in the long term, without measurably increasing stream temperatures in the short or long term.

Treatments within the riparian zone that are outside the variable width ecological protection zone would be done to promote forest health as discussed above. Canopy closures would remain above 40%, and species diversity would be maintained. Forty percent was selected because it was considered by the silviculturist to be the maximum canopy closure that should remain on some sites and was designed to promote late successional characteristics. Projects within this area would be designed to ensure that habitat conditions for the wildlife and plant species that use this zone are not degraded.

Within regeneration harvest and overstory removal units, full NFP designated riparian reserve buffers would be used (one to two site potential trees). Within these units most riparian reserves are currently on a trajectory toward late successional stand conditions, and therefore not in need of forest health treatments. These buffers would be used as an ecological reserve for plants and animals which are present within timber harvest units. Along perennial and intermittent streams this buffer would be equal to one site potential tree, and two site potential tree lengths along fish streams and all streams that could potentially bear fish based on habitat conditions and accessibility.

Hazardous fuel treatments (HFT) are designed to reduce the existing fire hazard. This is accomplished by thinning the understory of a stand to reduce the amount of surface and ladder fuels present.

The desired future condition for fuels would be a reduction in ladder fuels that pose a risk of crown fire initiation, discontinuous fuel concentrations, and a minimized presence of fine fuels.

Treatments include slashing, hand-piling, pile-burning, and underburning. Slashed material would be between 1 and 7 inches in diameter and have a general spacing of conifers at 20 x 20 feet and hardwoods at 40 x 40 feet, or closer. Riparian reserve fuels reduction would be permitted up to 25 feet of the stream bankfull width. Maintenance underburning is generally performed within 7 years following initial treatments and would be driven by the condition of the stand and re-growth of slashed vegetation.

For activity slash created from timber harvesting, fuel reduction treatments include slashing, hand-piling, pile-burning, underburning, and/or lop-and-scatter. The lop-and-scatter method would be used on cut material up to 6 inches in diameter. This method is normally used when there is very little treatment needed within a unit. Areas that pose an increased fire hazard due to residual slash would be hand-piled and burned rather than receive a lop-and-scatter treatment. Appropriate treatments depend on the amount of slash created and would therefore be determined by an assessment of the post-activity condition of each unit.

Temporary Spur Road Construction would allow operator access to harvest units. After harvest is complete, the roads would be decommissioned after use.

Permanent Road Construction would include clearing, grubbing and pioneering of a new road template and would allow the BLM future access to proposed harvest units.

Road decommissioning would include partial re-contouring (pulling of fills), channel stabilization, removal of culverts and cross drains, sub-soiling, planting, barricading, placement of woody material, seeding with native seed and mulching. Roads would be closed with a device similar to an earthen barrier or equivalent. Roads would not be maintained in the future.

Road Reconstruction would restore a road to its original or modified condition.

Road Maintenance would keep a facility (road) in such a condition that it may be continuously utilized at its original or designed capacity and efficiency, and for its intended purposes.

Bridge Replacement includes bridge removal and replacement, installation of footings (outside the influence of the stream), seeding, mulching and replanting.

Stream Crossing and Culvert Replacement. On all units except unit 17-1c, the use of existing haul roads would be the only ground disturbing activity within the EPZ. In unit 17-1c up to two pieces of heavy equipment would be allowed to cross through the EPZ and stream channel two times; once to access the unit, and once upon completion of harvesting activities, to exit the unit. Crossing of the stream channel would be designated by the area hydrologist and engineer, and would be done using a pre-designed log, natural bottom, or mat ford, located at a 90 degree angle to the channel. This ford would be removed following use, along with the appropriate erosion control devices. The streambanks would also be stabilized and built up to redirect flow back into the historic channel that this stream naturally flowed through prior to being redirected as a result of skid road compaction during past logging operations. An existing in-stream culvert would be replaced downstream of this unit on road 32-5-17, sized to accommodate the additional flow that would occur within this channel as a result of redirecting the natural flows back into the channel.

Biomass Utilization. Biomass utilization measures would be used in conjunction with mechanical and prescribed burning techniques to reduce fire hazard. Material to be utilized would only be removed from areas already identified as hazardous fuel reduction units or activity units, and removal would be restricted to within 300 feet along roads. Material removal may occur during or after fuels reduction treatment implementation. Removal would occur during implementation if conducted under a service contract. Removal would occur after implementation by leaving some of the slashed material scattered on the ground to be gathered by members of the public authorized by special forest product permits. In either case, falling of any undesignated vegetation would be prohibited and removal of material would be by hand only.

Stewardship contracting. Stewardship contracting provides the packaging of commercial harvesting to fund needed service work. Stewardship projects are a means to achieve land management goals and meet local and rural community needs (USDI BLM IM No. 2004-081, 1-15-04). In the face of declining fiscal and personnel resources, government agencies are emphasizing the construction of “cooperative ventures between two or more parties who leverage resources to accomplish a mutually beneficial project …” (Oregon/Washington BLM Partnership Strategy 7/04).

2.3 Project Design Features

Project design features (PDFs) are specific measures included in the site specific design of Alternatives 2 and 3 to eliminate or minimize adverse impacts on the human environment. These PDFs were developed by the Westside interdisciplinary team from guidance of Best Management Practices (BMPs) identified in the Medford District ROD/RMP, Appendix D, and resource protection measures specific to the Planning Area.

2.3.1 Soil Productivity, Residual Trees and Coarse Woody Debris

- Lateral yarding would be required on all units to protect residual leave trees and existing conifer regeneration. Yarding carriages would be required to maintain a fixed position during lateral yarding to reduce damage to the residual stand.

- Tractor and cable yarding on **commercial thin** units would not be allowed between March 1 and June 1 to prevent damage of bark slippage on residual trees. Yarding would also not be allowed during this period combination harvest treatments of commercial thin and regeneration harvest or overstory removal where the majority of affected tress are less than 14 inches diameter breast height.

- All trees to be yarded in cable units would be limbed and cut into lengths not to exceed 41 feet prior to yarding to minimize damage to residual trees. This restriction could be waived if purchaser demonstrates that there is no increase of damage to residual trees from yarding trees over 41 feet.

- Hardwoods not designated for cutting within treatment units would be reserved and to the extent possible would not be cut during falling and yarding operations.

- Yarding would be completed within one month of falling in overstory removal harvest units to minimize damage to conifer regeneration.

- Directional falling toward the lead would be required to minimize damage to residual (reserve) trees.

- In overstory removal harvest units, trees would be felled away from residual conifer regeneration.

- Prescribed fire plans are prepared for all burning activities. The plans are designed to ensure that resource and fire management objectives are met by setting parameters under which the burning may take pace. Prescribed burning would be conducted in a manner that would minimize damage to reserve trees, duff, and soil, and to avoid loss of large, coarse woody debris.

- Piles would be burned in the fall to winter season after one or more inches of precipitation have occurred. Patrol and mop-up of burning piles would occur when needed to prevent treated areas from reburning or becoming an escaped fire.

- Landing piles would be burned, if necessary, on all harvest units. In units where biomass utilization would occur, no material would be allowed on the running surface of roadways, including turnouts, or between the ditch line and the shoulder.

- All non-hazardous snags would be retained in all harvest units. If it is necessary to fall snags for safety reasons, they would remain on site as down wood. All existing naturally occurring dead and down woody debris, greater than or equal to 16 inches diameter, would remain on site.

2.3.2 Air Quality / Smoke Management

- All prescribed burning would be managed in a manner consistent with the requirements of the Oregon Smoke Management Plan administered by the Oregon Department of Forestry and the regulations established by the Air Quality Division of the Oregon Department of Environmental Quality.

- Local residents would be advised of prescribed burning on the Glendale Resource Area prior to seasonal burning through News Releases.

2.3.3 Cultural Sites

- Surveys in Planning Area revealed some cultural sites. All known sites would be protected and buffered. If cultural resources are found during project implementation, the project would be redesigned to protect the cultural resource values present, or evaluation and mitigation procedures would be implemented based on recommendations from the Resource Area archaeologist with concurrence from the State Historic Preservation Office.

2.3.4 Visual Quality

- Unit 17-4. To meet VRM III guidelines for the Fortune Branch Rural residential Area, landings would not exceed VRM III guidelines of existing landscape. If visible to Fortune Branch 40% of the vegetative ground cover on all aspects facing the community would be retained if safety allows as determined by the Authorized Officer.

- Units 25-1, 27-1, 34-2 & 3, 35-1. To meet the guidelines for VRM Class II, utilize the existing road prism along the new road construction or on the west side of the main ridge for helicopter landings. To maintain the visual quality to the casual observer along the I-5 corridor, 40% of the vegetative ground cover on the south and east aspects of the landing would be retained if safety allows as determined by the Authorized Officer.

2.3.5 Rural Interface Areas

- Dust abatement measures would be used, where needed, on BLM roads within ¼ mile of residents in the following areas: McCullough Creek Road, Windy Creek Road, Fortune Branch Road, Barton Road, Speaker Road, Tunnel Road, and Woods Creek Road.

- Where quarry expansion is planned, place expansion away from the view of rural residents where possible.

- Maintain a "no-fly zone" over rural residential lands when helicopter-harvesting methods are in use. Notify rural residents located within ¼ mile of helicopter harvest units (in designated RIAs), of potential flight activities, prior to harvest activities.

2.3.6 Noxious Weeds

- Heavy equipment would be washed before initial move-in and prior to all subsequent move-ins into the Planning Area to remove soil and plant parts to prevent the spread of invasive and noxious weeds.

- Only logging and construction equipment inspected by the BLM would be allowed to operate within the Planning Area, or in the immediate vicinity of the Planning Area. All subsequent move-ins of logging and construction equipment would be treated the same as the initial move-in.

- Cleaning shall be defined as removal of dirt, grease, plant parts, and material that may carry noxious weed seeds and parts onto BLM lands. Cleaning prior to entry onto BLM lands may be accomplished by use of a pressure hose.

- Logging and construction equipment would be visually inspected by a qualified BLM specialist to verify that the equipment has been cleaned.

- Native grass/forb seeding would be used on areas disturbed by temporary road construction to minimize the introduction of noxious weeds.

2.3.7 Streams and Riparian Zones

- On all units, a minimum 25 foot no treatment buffer, from bankfull width, would be used to protect streambank stability.

- Within 60 feet of all streams angular canopy density would remain within 5% of existing levels. Only fuels treatments, and young stand management activities that do not use ground disturbing yarding systems would be allowed.

- Within the variable width ecological protection zone (discussed in section 2.2.1) canopy closure would remain above 50% and species diversity would be maintained. All coarse and large woody debris would be left on site, and no ground disturbing yarding systems would be used.

- In the area outside the ecological protection zone but within the 1-2 site potential tree length NFP riparian reserve boundary, canopy closures would remain above 40%, and species diversity would be maintained. A minimum of partial suspension would be used, and all corridors with exposed mineral soil would be rehabilitated using waterbars, seed, mulch or small dense woody debris, as necessary to minimize erosion.

- For riparian reserve areas adjacent to regeneration and overstory removal units a one site potential tree (185 feet in this watershed) would be used along perennial and intermittent streams and a two site potential tree length buffer would be used along fishbearing streams (370 feet).

- Unless unsafe, trees within riparian reserve boundaries (one or two site potential trees) would be directionally felled away from the stream, and upslope trees would not be felled into riparian reserves.

- To reduce sediment input downstream of culvert replacement sites straw bales draped with geotextile fabric for sediment capture and removal would be placed below the work area and removed prior to September 15th of the same calendar year.

- Flowing water would be diverted around each culvert replacement site whenever there is sufficient water volume, and would be returned to the channel immediately downstream of the work site.

- Springs and perennial wet areas found during layout of timber harvest units would be buffered in accordance with the buffer widths that have been designated for other perennial and intermittent streams within that unit. Slumps, intermittent seeps, and other unstable areas would be buffered by leaving one row of overstory trees or a 25 foot diameter (whichever is greatest) around these areas for soil stabilization.

- Trees in no-harvest portions of riparian reserves that are accidentally knocked over during falling and yarding would be retained on site for fish /wildlife habitat or would be treated with activity fuels.

- Helicopter refueling sites would not be located within riparian reserves.

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- No new landings would be constructed within riparian reserves. Expansions of existing landings within the riparian reserve would be allowed outside the EPZ to facilitate logging systems and would be pre-designated and approved by the Authorized Officer. Landings with exposed soils would be winterized prior to October 15 of the same year. However, if existing road surfaces or landings are utilized, only areas outside of the road prism would be ripped and mulched. Helicopter landings would only be rocked, if necessary, to prevent erosion and sedimentation into the stream.

- Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition in order to minimize potential for leakage into streams. No re-fueling of heavy equipment would occur within 150 feet of streams or stream crossings.

- Cleaning culvert inlets in stream channels would be restricted to between July 1 and September 15 in accordance with Oregon Department of Fish and Wildlife (ODFW) in-stream work period guidelines

- Foam would not be used within 100 feet of streams and wetlands to control the spread of prescribed fire.

- Refueling of chainsaws and pumps would be done no closer than 150 feet of any stream or wet area. Spilled fuel and oil would be cleaned-up and would be disposed of at an approved disposal site.

2.3.8 Sedimentation and Soil Compaction

2.3.8.1 Sedimentation and soil compaction from logging.

- Tractor yarding would be allowed between May 15 and October 15 (during the dry season, typically) of the same year to minimize the amount of soil disturbance and compaction.

- Old skid trails would be used whenever practical and new skid trails would be placed at least 150 feet apart, where topography allows, to reduce the amount of compaction within tractor yarded units. New skid roads, with the exception of one skid trail to be used one time during entry and exit in unit 17-1, would be located outside of the EPZ and would be pre-designated and approved by the Authorized Officer. Total compaction would not exceed 12 percent of harvest area (RMP p. 166).

- Tractors would not exceed nine feet in width and would be equipped with an integral arch to minimize soils disturbance and compaction. Skid trails including turning points would be 12 feet width on average.

- To minimize soil disturbance the use of blades while tractor yarding would not be permitted to keep soil organics on site. Equipment would walk over as much ground litter as possible to reduce compaction.

- Native grass/forb seeding, mulching or hay bale placement would be used, where needed, to minimize surface erosion, and reduce stream sedimentation.

- Partial suspension (at a minimum) would be required on all cable units to minimize soil disturbance. Full suspension would be required if yarding is within the EPZ.

- To reduce gullying and surface erosion following harvest that could lead to offsite transport of sediment, all yarding corridors with more than 50% exposed mineral soils would be rehabilitated. This would include the installation of waterbars, constructed in accordance with RMP standards and guides (RMP, p. 167), re-contouring of displaced soils adjacent to corridors, and applying mulch or fine slash to cover exposed soil.

- Cable yarding lines would be respooled when changing yarding corridors.

- The number of yarding corridors would be minimized to reduce soil compaction and displacement from cable yarding. Corridors would be located approximately 150 feet apart at the tail end.

- Restrict tractor yarding to slopes less than 35% in order to prevent excessive soil disturbance.

- Skid trails within tractor units would be discontinuously subsoiled to a depth of at least 18 inches using a winged ripper, seeded, water-barred, mulched, and blocked during dry soil conditions, upon completion of current harvest. Where it is determined by the Authorized Officer that subsoiling skid trails would cause unacceptable damage to the root systems of residual trees along a majority of the skid trail, such as where new skid trails are constructed within the dripline of leave trees in commercial thin units, subsoiling may be intermittent, or scarification may be used instead.

- If skid roads would be needed to complete harvest the following season, water-bars would be constructed and mulch would be applied to exposed soil prior to falls rains to reduce sedimentation during winter months.

- Upon completion of harvesting a unit, all skid trails would be planted, water-barred, mulched, and blocked prior to Oct 15 of the year of harvest. Water bars would be installed at the same time as sub-soiling. Water bar spacing and drainage angles used to rehabilitate tractor skid trails would be based on the NFP Standards and Guidelines erosion control measures for timber harvest which considers slope and soil series (S&G, p. 167).

2.3.8.2 Sedimentation and Soil Compaction from Roads and Landings

- Temporary roads would be winterized with water bars, berms, dikes, dams, sediment catchment basins, gravel, or mulched as needed. "Winterize" is the process that minimizes the amount of erosion which would take place before disturbed soil and new surfaces stabilize.

- Temporary spur roads and landings built would be decommissioned after use. This would involve discontinuous sub-soiling (Davis, pp. 138 & 139) to depth of 18" with winged rippers, mulching, pulling culverts, water-barring and barricading, and planting with conifer seedlings, and/or native grass/forbs mixtures. Additionally, where cut and fill construction was needed, fill material would be pulled back over road bed following sub-soiling.

- To reduce erosion and stream sedimentation, permanent road construction, reconstruction, road maintenance, temporary road construction, road decommissioning, and log hauling on natural surface roads and rocked roads would generally only be allowed between May 15 and October 15 of the same calendar year. Additionally, if wet weather conditions occur during this period, log haul may be suspended on roads with either erosive surfaces or poor drainage. Upon written request from the purchaser, the Authorized Officer could approve a provisional off-season log hauling agreement if dry weather and soil conditions exist during the restricted hauling period.

- Crossdrain culverts would be added to haul roads as determined by a BLM engineer to help reduce downslope surface erosion and sediment entering streams and draws. Dispersing flow into multiple culverts where necessary would reduce ditchline scour caused by excess water within ditchlines and allow it to absorb into streamside vegetation.

- Blading of ditchlines and the road surfaces would only be done to maintain or restore proper drainage.

- Energy dissipaters and down spouts would be installed as the need is determined by a BLM engineer (e.g. rock material) at new or existing cross-drain and stream culverts, where necessary, to protect road fill slopes that are not adequately protected by natural materials.

- Road cuts, fill slopes, borrow material and other bare ground disturbed by road construction activities would be mulched and seeded prior to autumn rains (generally October 15).

- Landings would be located in approved sites and designed with adequate drainage. Helicopter landings would be constructed and used in the same season, but if they are to be left over winter, the landings would be mulched to prevent erosion. Step landings would be re-contoured following use. New landings would be sub-soiled following logging and planted with conifers. Exceptions would be where landings utilize existing road prisms, in which case the original roads would not be sub-soiled or planted. Dust abatement on landings would include rocking and/or applying lignin. Adequate drainage would be provided to minimize erosion. Helicopter landings would only be rocked if it is necessary to prevent erosion and stream sedimentation.

2.3.9 Special Status Species and their Habitats

2.3.9.1 Northern Spotted Owl

- Any of the following PDFs may be waived in a particular year if nesting or reproductive success surveys conducted according to the U.S. Fish and Wildlife Service (USFWS) - endorsed survey guidelines reveal that spotted owls are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year. Previously known well established sites/activity centers are assumed occupied unless protocol surveys indicate otherwise.

- For active nest sites or unsurveyed suitable habitat within 0.25 mile of the quarry operation (1.0 mile for blasting), restrict operation of the quarry from March 1 through June 30 (unless protocol surveys demonstrate non-nesting).

- Under burning (for site preparation) would not take place within 0.25 mile of known active northern spotted owl nests between March 1 and June 30 (or until two weeks after the fledging period) unless smoke would not drift into the nest stand.

- Work activities (such as tree felling, yarding, road construction, hauling on roads not generally used by the public, and prescribed fire) would not be permitted within specified distances (see table below from 2006 Biological Assessment), of any nest site or activity center of known pairs and resident singles between March 1 and 30 June (or until two weeks after the fledging period) – unless protocol surveys have determined the activity center to be not occupied, non-nesting, or failed in their nesting attempt. March 1 – June 30 is considered the critical early nesting period. March 1 – June 30 is considered the critical early nesting period; the restricted season may be extended during the year of harvest, based on site-specific knowledge (such as a late or recycle nesting attempt). The boundary of the prescribed area may be modified by the action agency biologist using topographic features or other site-specific information. The restricted area is calculated as a radius from the assumed nest site (point).

Harassment distances from various activities for spotted owls.

Type of Activity	Distance at which spotted owl may flush or abort a feeding attempt
a blast larger than 2 pounds of explosives	1 mile
a blast of 2 pounds or less	120 yards
an impact pile driver, a jackhammer, or a rock drill	60 yards
a helicopter or a single-engine airplane	120 yards for small helicopters; 0.25 miles for Type 1 or 2 helicopters
chainsaws (hazard trees, precommercial and commercial thinning)	65 yards
heavy equipment	35 yards

2.3.9.2 Essential Fish habitat (EFH)

The following measures were developed from the October 18, 2002 Programmatic Biological Opinion issued by the National Marine Fisheries Service. These measures are intended to minimize effects to Essential Fish Habitat.

Construction (New Road Construction, Road Decommissioning, Bridge Replacement and Culvert Replacements):
Pollution and erosion control measures would be developed for each authorized project to prevent point-source pollution related to construction operations. The measures would contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

- Methods would be used to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging area.

Before work begins a spill containment and control plan would be agreed upon between the contractor and the BLM contract officer or contract officer representative. The plan would contain notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that would be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.

Effective erosion control measures would be in-place at all times during the contract. Construction activities within the project vicinity would not begin until all necessary temporary erosion controls (*e.g.*, sediment barriers) are in place.

- During construction, all erosion controls must be inspected daily during periods of precipitation and weekly during the dry season to ensure they are working adequately. Working adequately means no turbidity plumes are evident during any part of the year in live streams.
- If inspection shows that the erosion controls are ineffective, work crews must be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.
- Sediment must be removed from erosion controls once it has reached 1/3 of the exposed height of the control.

Site preparation would be completed in the following manner, including the removal of stream materials, topsoil, surface vegetation and major root systems.

- Any in-stream large wood or riparian vegetation within 1 site potential tree height that is removed during construction would be replaced with a functional equivalent.
- Whenever the Planning Area is to be revegetated or restored, native channel material, topsoil and native vegetation removed for the project would be stockpiled for redistribution on the Planning Area.

Earthwork would be completed in the following manner.

- Material removed during excavation would only be placed in locations where it cannot enter streams or other water bodies.
- All exposed or disturbed areas would be stabilized to prevent erosion. Areas of bare soil within 150 feet of waterways, wetlands or other sensitive areas would be stabilized by native seed, as quickly as reasonable after exposure.
- Any turbidity caused by the project shall not exceed DEQ water quality standards, as described in Oregon Administrative Rules (OARs) Division 41.

Site restoration and clean-up, including protection of bare earth by seeding, planting, mulching, is done in the following manner.

- All damaged areas would be rehabilitated similar to or better than pre-work conditions including restoration or original streambank lines, and contours.

Road Maintenance Activities:
If slide and waste material is removed from roads it would be disposed of in stable sites approved by an engineer or other qualified personnel. Sites would be located where sediment could not move into stream channels.

The Oregon Department of Fish and Wildlife (ODFW) In-Water Work Timing guidelines would be followed for in-stream work such as culvert replacements, except where the potential for greater damage to water quality and fish habitat exists. In-stream work could occur from July 1 through September 15.

Avoid application of dust abatement materials (for example, lignon) within 25-feet of a water body or stream channel during or just before wet weather, and at stream crossings or other locations that could result in direct delivery to adjacent water bodies.

Ensure that all large wood is retained in the stream channel during culvert cleaning activities by moving logs which had accumulated on the upstream side of a culvert to the downstream side of the culvert.

Road Decommissioning:
Dispose of slide and waste material in stable, non-floodplain sites. Disposal of slide and waste material within existing road prism or adjacent hillslopes is acceptable to restore natural or near-natural contours, as approved by an engineer or other qualified personnel.

In-stream activities associated with road decommissioning such as culvert removal would follow ODFW Guidelines for Timing of In-Water Work, except where the potential for greater damage to water quality and fish habitat exists.

Bridge Replacement:
Project actions would follow all provisions of the Clean Water Act (40 CFR Subchapter D) and DEQ's provisions for maintenance of water quality standards. Toxic substances would not be introduced above natural background levels in waters of the state in amounts which may be harmful to aquatic life.

2.4 Description of the Alternatives

2.4.1 Alternative 1 (No Action)

The No Action Alternative provides a baseline for the comparison of the alternatives and describes the existing condition and the continuing trends within the Planning Area. Under the RMP, the majority of harvest and silvicultural activities are scheduled to occur within the matrix allocation. Selection of this alternative would not meet the purpose and need of the project (described in Chapter 1) of harvesting timber and implementing the Medford RMP at this time. Consideration of this alternative provides the answer to the question of what it would mean for the objectives not to be achieved. Selection of this alternative would not constitute a decision to reallocate these lands to non-commodity uses.

Future harvesting in this area would not be precluded and could be analyzed under a subsequent EA. Decommissioning and repair of roads to reduce road related impacts would be deferred indefinitely. Road maintenance would be dependant on funding and reciprocal road use agreements.

Hazardous fuel reduction treatments to mitigate existing wildfire hazard within this Planning Area would be delayed indefinitely, as would the opportunity to develop biomass utilization avenues.

Stewardship project development would not occur at this time, nor would the associated employment opportunities for local communities or the opportunity to fund and implement restoration and maintenance projects.

2.4.2 Alternative 2 (Proposed Action)

The Proposed Action emphasizes fully meeting the matrix land allocation objectives of producing a sustainable supply of timber while providing connectivity and both late-successional and early-successional habitat (RMP, p. 38). See Alternative 2 Map.

2.4.2.1 Timber Harvesting

Under Alternative 2, approximately 3,374 acres within 93 units would be harvested (See Appendix 5). Approximately 1,515 acres would be harvested by the regeneration (RH), overstory removal (OR) shelterwood (SW) and group select (GS) silvicultural methods. Approximately 1,859 acres within 42 units would be harvested by, commercial thinning (CT) and individual tree (SC) selection methods (See Silvicultural Prescriptions Appendix 4). It is anticipated that the acres proposed for harvest under Alternative 2 would be separated into four or five timber sales offered for sale during a period of two to three years.

Modified methods of harvest are proposed on land allocations having additional restrictions for other resource values such as visual resource management and late-successional habitat in connectivity blocks. Commercial thinning would maintain approximately 40% to 50% canopy closure.

2.4.2.2 Timber Yarding

Harvest yarding systems under Alternative 2 include the use of skyline cable, helicopter and tractor yarding. See Appendix 5 for each individual unit and the harvesting method proposed.

2.4.2.3 Road Work

Proposed road work associated with timber harvesting under Alternative 2 would include constructing, reconstructing, and maintaining roads that access proposed timber treatment units consistent with existing right-of-way agreements, bridge replacement, and road decommissioning (Table 2-2). Approximately 6.27 miles of temporary roads would be constructed and decommissioned after use, 0.49 mile of permanent roads would be constructed, 2.36 miles of road would be reconstructed, 0.84 miles of existing roads would be decommissioned, and one existing bridge would be replaced. Approximately 93.15 miles of roads would be maintained and 102.27 miles of road used for the hauling of timber (See **Appendix 6** for specific road descriptions).

The non-system road proposed to be fully decommissioned following use is located in T32S, R5W, Section 7, east ½ in the Fortune Branch sub-watershed and is accessed via BLM road 32-5-17. This Jeep road is classified as a poorly located, designed, constructed, and unnecessary. Decommissioning would include partial re-contouring (pulling of fills), channel stabilization, removing culverts and cross drains, sub-soiling, planting, barricading, placement of woody material, seeding with native seed and mulching.

The bridge proposed for replacement in T32S, R6W, Section 13 would include road realignment, road decommissioning, bridge realignment, bridge removal and replacement, installation of footings (outside the influence of the stream), seeding, mulching and replanting.

2.4.2.4 Quarries

Rock, if needed, would be obtained from the following quarries and are proposed for expansion and further development (except 119):

- 013 Woodford Quarry — T32S R5W Section 33 SESW quarter. Extend 5 acres max.
- 022 Fir Point Quarry — T32 S R6W Section 17 NE quarter. Extend 5 acres max.
- 116 Wood Creek — T32 S R6W Section 15 NWNE quarter. Extend 5 acres max.
- 119 McCullum Creek — T32 S R 5W Section 33 SENE quarter. No extension planned.
- 066 Fortune Return — T32 S R5 W Section 17 NW quarter. Extend 10 acres.

2.4.2.5 Activity Fuels Treatments

All 3,374 of activity fuels created in harvest units would be treated by slashing and hand piling or lop-and-scatter methods to prepare the site for tree planting, to control competing vegetation, and to reduce the fuel loading. This work is required by the timber sale purchaser as part of the timber sale contract. Prescribed burning of slash would include a combination of pile burning and underburning of material between 1 and 7 inches in diameter. Appropriate treatments depend on the amount of slash created and would be determined by an assessment of the post-activity condition of each unit. Activity units or portions thereof deferred from action alternatives may receive hazardous fuel reduction treatments. Deferred activity unit boundaries may increase or decrease in order to meet hazardous fuel reduction objectives. Increased unit boundaries would not exceed surveyed areas.

2.4.2.6 Hazardous Fuel Treatments

Hazardous fuel reduction treatments would be implemented on approximately 988 acres (See Appendix 7) where existing vegetation and fuel loading pose a wildfire hazard. Maintenance underburning may occur 2-7 years after the initial treatments of slashing, hand piling, and pile burning, depending on the condition of the stand and re-growth of slashed vegetation. Slashed material would be between 1 inch and 7 inches in diameter with a general spacing of conifers at 20 x 20 feet and hardwoods at 40 x 40 feet or closer. Unit boundaries may be altered during the layout process to facilitate logistically practical implementation. Unit boundary adjustments would not exceed surveyed areas.

2.4.2.7 Stewardship Project

The Fortune Branch Stewardship project includes several service items: maintaining a progeny test site by thinning and pruning the 12 acre stand and removing 1,000 feet of wildlife fencing; cutting trees affected by Armillaria root rot; and implementing hazardous fuel reduction treatments. The cost of these service items would be offset by commercially harvesting unit 17-1, which is overstocked and in need of thinning to promote stand vigor.

The progeny test site would have the wildlife fence removed because the stand is up to 12 inches DBH and not in need of protection. The 12 acre stand would also be thinned to 13 x 13 feet spacing with remaining trees to be pruned to a height of 17 feet. The test site is included in the analysis of commercial thin unit 17-1 because the size of the trees may be viable as firewood, poles, or other small diameter commercial forest products.

There is one unit that is infected with Armillaria root rot and would be treated. The infected trees would be felled and left in place with the limbs being piled and burned. The intent is to mitigate the spread of Armillaria which currently affects approximately 3 to 5 acres.

Commercial thin unit 17-1 is analyzed in this document with the other commercial thin units. Hazardous fuel reduction unit W-17-1 has been identified to be included in the stewardship project and is analyzed in this document with the other fuels units. More fuels units analyzed in this document could be added to the stewardship project as it is further developed.

2.4.3 Alternative 3

Alternative 3 was developed in response to the risk of increases of peak flows in the transient snow zone. Under Alternative 3, all RH/OR units located within the TSZ HUC 6 sub-watersheds, where baseline conditions currently exceed 25%, would be deferred, or the harvest prescription changed to maintain a minimum of 30% canopy. Though the BLM no longer clearcuts, open space (stands with less than 30% canopy cover) in excess of 25% was considered a trigger point for the potential for increased peak flows, especially in instances where more than 25% of the TSZ is also in open condition. See Alternative 3 Map.

2.4.3.1 Timber Harvesting

Under Alternative 3 approximately 3,009 acres within 80 units would be harvested (See Appendix 5). Approximately 1,338 acres would be harvested by the regeneration (RH), overstory removal, shelterwood and group select silvicultural methods. Approximately 1,671 acres would be harvested by density management, commercial thinning and individual tree selection methods (See Silvicultural Prescriptions Appendix 4). Modified methods of harvest are proposed on land allocations having additional restrictions for other resource values such as visual resource management and late-successional habitat in connectivity blocks. Thinning would maintain approximately 40% to 50% of the canopy.

2.4.3.2 Timber Yarding

Harvest yarding systems under Alternative 3 include the use of skyline cable, helicopter and tractor yarding. See Appendix 5 for each individual unit and the harvesting method proposed.

2.4.3.3 Road Work

Under Alternative 3, approximately 5.23 miles of temporary roads would be constructed and decommissioned after use, 0.49 mile of permanent roads would be constructed, 2.26 miles of road would be reconstructed, 0.74 miles of existing roads would be decommissioned, and one existing bridge would be replaced (Table 2-2). Approximately 93.15 miles of roads would be maintained and 101.23 miles of road used for the hauling of timber (See **Appendix 6** for specific road descriptions).

2.4.3.4 Quarries

Treatments under Alternative 3 would be the same as Alternative 2.

2.4.3.5 Activity Fuel Treatments

Under Alternative 3, all 3,009 acres of activity fuels created from harvesting may be treated by the slash and hand piling or lop-and-scatter methods. These methods would prepare the site for tree planting, controlling competing vegetation, and to reduce fuel loading. Subsequent prescribed burning of slash would include a combination of pile burning and underburning of woody material between 1 and 7 inches in diameter. Appropriate treatments depend on the amount of slash created and would be determined by an assessment of the post-activity condition of each unit. Activity units or portions thereof deferred from action alternatives may receive hazardous fuel reduction treatments. Deferred activity unit boundaries may increase or decrease in order to meet hazardous fuel reduction objectives. Increased unit boundaries would not exceed surveyed areas

2.4.3.6 Hazardous Fuel Treatments

Treatments under Alternative 3 would be the same as Alternative 2 (See Appendix 7).

2.4.3.7 Stewardship Project

The proposed stewardship project under Alternative 3 is the same as Alternative 2.

2.5 Comparison of Alternatives

Table 2 - 1. Comparison of Action Alternatives

Specific Features	Alternatives	
	2	3
Timber Harvest Levels		
Units Treated	93	80
Acres Treated	3374	3009
Regeneration Harvest/ Group Select		
Units Treated	51	43
Acres Treated	1515	1338
Range in Unit Size (Acres)	1-122	1-122
Commercial Thinning:		
Units Treated	42	36
Acres Treated (40% canopy)	1859	1671
Range in Unit Size (Acres)	5-264	5-264
Post-harvest Fuels Treatments	3374	3009
Units Treated	93	80
Acres Treated	3374	3009
Hazardous Fuels Treatments (Acres of non-harvest units)	988	988

Specific Features	**Alternatives**	
	2	**3**
Road Work:		
Perm roads(Mi)	0.49	0.49
Temp. roads (Mi.)	6.27	5.23
Road Reconstruction (Mi.)	2.36	2.36
Maintenance (Mi.)	93.15	93.15
Haul Miles	102.27	101.23
Decommission (Mi.)	0.74	0.74
Harvest Methods (Acres)		
Tractor	583	560
Cable	1759	1538
Helicopter	1033	911

Table 2 - 2. Summary of Consequences

	No Action	Alt. 2	Alt. 2 with Mitigation #1	Alt. 2 with Mitigation #2	Alt 3	Alt 3 with Mitigation #1	Alt 3 Mitigation # 2
Supply of timber to economy (acres)	0	3,374	3136	3374	3,009	2811	3009
Long-term reduction of fire hazard from treatments to reduce hazardous fuels (acres)	0	988	988	988	988	988	988
Short –term increase of fire hazard from commercial thinning (acres)	0	1,859	1,859	1,859	1,671	1,671	1,671
Cumulative decrease in fire hazard (acres)	Increase fire hazard up to 8,099 acres	3,095	3,095	3,095	2,907	2,907	2,907
Decrease of fire risk (net miles of new road for public access)	0	0.25	0.25	0.25	0.25	0.25	0.25
Permanent road construction (miles)	0	0.49	0.49	0.49	0.49	0.49	0.49
Temporary roads built and decommissioned after use	0	6.27	5.77	6.27	5.23	4.73	5.23
Existing roads decommissioned (miles)	0	0.74	0.74	0.74	0.74	0.74	0.74
Net reduction of roads (miles)	0	0.25	0.25	0.25	0.25	0.25	0.25
Loss of Soil Productivity (%)	0	0.42%	0.24%	0.35%	0.35%	0.35%	0.35%
Additional Compaction in Planning Area (%)	0%	0.53%	0.53%	0.3%	0.48%	0.48%	0.48%

	No Action	Alt. 2	Alt. 2 with Mitigation #1	Alt. 2 with Mitigation #2	Alt 3	Alt 3 with Mitigation #1	Alt 3 Mitigation # 2
Effects to Essential Fish Habitat (Magnuson Stevens Act call)	**No Effect**	**Minimal Adverse Affect**	**Minimal Adverse Affect**	**Minimal Adverse Affect**	**Minimal Adverse Affect**	**Minimal Adverse Affect**	**Minimal Adverse Affect**
NSO Suitable habitat removed (acres)	**0**	**1,515**	**1,277**	**1,515**	**1,338**	**1,140**	**1,338**
NSO Suitable habitat downgraded (acres)	**0**	**1,567**	**1,186**	**1,567**	**1,379**	**1,012**	**1,379**
NSO habitat degraded (acres)	**0**	**1,280**	**0**	**1,280**	**1,280**	**0**	**1,280**
Removal of NSO Critical Habitat (acres)	**0**	**238**	**0**	**0**	**198**	**0**	**0**
Downgrade of NSO Critical Habitat (acres)	**0**	**381**	**0**	**0**	**367**	**0**	**0**
Degrade of NSO Critical Habitat (acres)	**0**	**557**	**0**	**0**	**557**	**0**	**0**
Removal or downgrade of Fisher habitat (acres)	**0**	**3,082**	**2,790**	**3,082**	**2,425**	**2,133**	**2,425**

Chapter 3.0 Affected Environment and Environmental Consequences

3.1 Introduction

In accordance with law, regulation, executive order, policy and direction, an interdisciplinary team reviewed the elements of the human environment to determine if they would be affected by the alternatives described in Chapter 2.0. Those elements of the human environment that were determined to be affected define the scope of environmental concern (**see Environmental Elements in Appendix 2 for full list of elements considered**). The Affected Environment portion of this chapter describes the current conditions in the Westside Planning Area. The relevant resources that could be potentially impacted are: fire risk and hazard; special status wildlife species; soils, hydrology and fisheries; and essential fish habitat as the result of management activity.

The Environmental Effects portion of this chapter provides the analytical basis for the comparisons of the alternatives (40 CFR § 1502.16) and the reasonably foreseeable environmental consequences to the human environment that each alternative would have on the relevant resources. Impacts can be beneficial, neutral or detrimental. This analysis considers the direct impacts (effects caused by the action and occurring at the same place and time), indirect impacts (effects caused by the action but occurring later in time and farther removed in distance but are reasonably foreseeable) and cumulative impacts (effects caused by the action when added to other past, present and reasonably foreseeable future actions on all land ownerships). The temporal and spatial scales used in this analysis may vary depending on the resource being affected.

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the “environmental analysis required under NEPA is forward-looking,” and review of past actions is required only “to the extent that this review informs agency decision-making regarding the proposed action.” Use of information on the effects on past action may be useful in two ways according to the CEQ guidance. One is for consideration of the proposed action’s cumulative effects, and secondly as a basis for identifying the proposed action’s direct and indirect effects. Past harvest activities such as the Lost Fortune Timber Sale in 1995 have been accounted for under the satellite change detection data used to estimate harvesting the last few decades.

The CEQ stated in this guidance that “[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.” This is because a description of the current state of the environment inherently includes the effects of past actions. The CEQ guidance specifies that the “CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions.” Our information on the current environmental condition is more comprehensive and more accurate for establishing a useful starting point for a cumulative effects analysis, than attempting to establish such a starting point by adding up the described effects of individual past actions to some environmental baseline condition in the past that, unlike current conditions, can no longer be verified by direct examination.

The second area in which the CEQ guidance states that information on past actions may be useful is in “illuminating or predicting the direct and indirect effects of a proposed action.” The usefulness of such information is limited by the fact that it is anecdotal only, and extrapolation of data from such singular experiences is not generally accepted as a reliable predictor of effects.

Scoping for this project did not identify any need to exhaustively list individual past actions or analyze, compare, or describe the environmental effects of individual past actions in order to complete an analysis which would be useful for illuminating or predicting the effects of the proposed action

When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete and unavailable information was posed: is this information “essential to a reasoned choice among the alternatives?” (40 CFR §1502.22[a]). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely reverse or nullify understood relationships. Although new information would be welcome, no missing information was determined as essential for the decision maker to make a reasoned choice among the alternatives.

3.2 Fire Risk and Hazard

3.2.1 Background Information

Fire is a chemical reaction that results in the release of energy in the form of heat and light when oxygen combines with a combustible material (fuel) at a suitably high temperature (heat). This combination of fuel, heat, and oxygen is often referred to as “the fire triangle” and if any one of the three components is not present, fire cannot burn (NIFC-A, 2006).

Fuels, in regard to land management, are defined as combustible vegetative material. Fuels are categorized in several ways, depending on their arrangement:

> *Surface Fuels*: Loose litter on the soil surface, normally consisting of fallen leaves or needles, twigs, bark, cones, and small branches that have not yet decayed enough to lose their identity; also grasses, forbs, low and medium shrubs, tree seedlings, stumps, downed branches, and downed logs (NIFC-B, 2006).
>
> *Ladder Fuels*: Material that provides vertical continuity between surface fuels and aerial fuels. Ladder fuels may include tall grasses and low lying

limbs of trees, along with bushes, shrubs, and small trees that make up the understory of a forested stand (NIFC-B, 2006).

Aerial Fuels: Vegetation in the forest canopy, including tree branches, twigs and cones, snags, moss, and high brush (NIFC-B, 2006).

Fire behavior, in the context of wildland fire, is dictated by fuel, weather, and topography. There are several types of fire behavior, categorized by the fuels that sustain the flame:

Surface fires burn on the surface of the ground and consume surface fuels. The fire stays on the ground.

Passive crown fires, also referred to as "torching," occur when the fire burns up through the ladder fuels and into the crown of an individual tree or small groups of trees. The fire is sustained by the surface fuels but a solid flame is not consistently maintained in the canopy of the stand of trees.

Active crown fires burn from the surface fuels, up through the ladder fuels, and into the aerial fuels enabling a solid flame to be consistently maintained in the canopy of the stand of trees.

Fire suppression strategies are the methods that firefighting personnel use in order to contain wildland fires. The strategy employed depends on the fire behavior. There are essentially two basic fire suppression strategies, direct attack and indirect attack.

Direct Attack can be used when a fire is exhibiting surface or passive crown fire behavior because the fire intensity is low enough to allow for safe operations by firefighters at the fire's edge (NWCG, 1994).

Indirect Attack is used when fire intensity is extreme enough to make working at the fire's edge impractical. This method is usually required when dealing with active crown fires (NWCG, 1994).

There are many advantages of using the direct attack method compared to indirect attack. The most important of which is that direct attack is safer for fire suppression personnel than indirect attack because firefighters can escape into the already burned area if necessary. Also, direct attack minimizes the amount of area burned because massive backfiring operations are not required, meaning fires can be contained at smaller sizes (NWCG, 2004). The goal of fire suppression on BLM lands within the Medford District is to contain 94% of fires at 10 acres or less (BLM, 2003).

3.2.1.2 Fire Behavior Threshold

Fire behavior dictates which fire suppression strategy may be effectively employed, and therefore the extent to which a fire may grow and the subsequent damage it may cause. Because fire behavior is critical in fire suppression strategy selection, it serves as the threshold used for analysis in the Environmental Effects section. The unit of measure of the threshold is considered in terms of flame length. Flame lengths under 4 feet can generally be effectively managed by fire suppression personnel, such as hand crews, using the direct attack method. Flame lengths greater than 4 feet generally require specialized equipment and indirect attack methods which are inherently more expensive and dangerous due to their complexity (Rothermel, 1982).

Table 3-1. Fire Behavior and Suppression Activities

Flame Length (in feet)	**Fire Suppression Strategy**	**Fire Suppression Tactics**
0-4	Direct Attack	Hand crews
4-8	Direct Attack	Dozers, engines, aircraft
8-11	Indirect Attack	Backfiring operations
11+	Indirect Attack	Backfiring operations

Fire behavior fuel models are a tool used to predict fire behavior, including flame length, which is the unit of measure for the fire behavior threshold. The models classify vegetation into four groups: grass, shrub, timber, and slash. Several fuel characteristic factors are incorporated into the models in order to predict the type of fire behavior a stand has the potential to produce under certain environmental conditions.

Table 3-2. Fire Behavior Fuel Models with Flame Lengths

Fire Behavior Fuel Model	Fuel Model Group	Flame Length (in feet)
1	Grass	4
2	Grass	6
3	Grass	12
4	Shrub	19
5	Shrub	4
6	Shrub	6
7	Shrub	5
8	Timber	1
9	Timber	2
10	Timber	4
11	Slash	3
12	Slash	8
13	Slash	10

These fuel models are the standard set used by the wildland fire community and they are commonly referenced from Anderson's 1982 publication "Aids to Determining Fuel Models for Estimating Fire Behavior." This set is used throughout this fire analysis, except in the portion that discusses the effects of regeneration harvest activities on fire behavior in which the Scott and Burgan set from the "Standard Fire Behavior Fuel Models" publication of 2005 are used. The 2005 fuel models were derived from the 1982 models. The 2005 set expands the number of fuel models, enabling the user to more accurately describe the stands under consideration. This allows for more accurate predictions when running computer models to determine fire behavior, which is done later in this fire analysis to understand the effects of regeneration harvest activities on fire behavior.

Fire hazard is the ability of a fire to spread once ignition has occurred (NIFC-B, 2006). It is contingent upon the fire behavior that a stand has the potential to produce. Fire behavior is determined by three factors: weather conditions like temperature, wind speed, and relative humidity; topographical characteristics such as slope, aspect, and elevation; and the type and arrangement of fuels available such as surface, ladder, or aerial. Fuels are often manipulated during management activities, which result in effects on fire hazard. The management activities proposed in the Westside project that have the potential to affect fire hazard are described in the Affected Environment section and their effects are analyzed in the Environmental Effects section.

Fire risk is the probability of a fire starting, as determined by the presence of ignition sources (NIFC-B, 2006). Ignition sources include natural causes such as lightning, and human causes such as improperly discarded cigarettes and unattended camp fires. Fire risk generally increases as human presence increases because these types of activities become more frequent. Recreational areas and areas along travel routes like trails and roads are usually at a higher risk of a fire ignition than areas that experience less frequent human activity. The management activities proposed in the Westside project that have the potential to affect fire risk are described in the Affected Environment section and their effects are analyzed in the Environmental Effects section.

3.2.2 Affected Environment

Reference Conditions

The Westside Planning Area is within the Klamath Province Region of southwestern Oregon where fire is recognized as a key natural disturbance process (Atzet and Wheeler, 1982). Prior to Euro-American settlement, low and mixed severity fires burned regularly in most dry forest ecosystems, such as those conditions found in this Planning Area. These types of fires controlled the regeneration of fire intolerant species (plants unable to physiologically withstand heat produced by fires), promoted fire tolerant species (for example ponderosa pine and Douglas-fir), and maintained an open forest structure by reducing forest biomass (Graham, 2004). Native Americans influenced vegetation patterns for over a thousand years in this area by igniting fires to enhance values that were important to their cultures (Agee, 1993). Large, low and mixed severity fires were a common occurrence in the area, evidenced by fire scars and vegetative patterns.

Ecosystems with substantial presence of fire contain species that are adapted to it in order to survive (Agee, 1993). The plant communities found in this Planning Area include the Douglas-fir/tanoak-madrone group, the Mixed conifer/madrone-deciduous brush/salal group, and the White oak-ponderosa pine/manzanita-wedgeleaf/grass groups (BLM, 1994). These plant communities are related to natural fire regimes I, II, and III (FMP, 2006).

Fire regimes refer to a general classification of the role fire would play across a landscape naturally, meaning in the absence of modern human intervention such as aggressive fire suppression efforts. The fire regimes are classified based on fire return interval and fire severity (FMP, 2006).

Table 3-3. Natural Fire Regimes

Fire Regime	**Fire Return Interval** (in years)	**Fire Severity**	**Percent of Planning Area**
I	<35	Low	25
II	<35	High	25
III	<50	Mixed	50
IV	35-100+	High	0
V	200+	High	0

Fire Regime I. 0-35 years, High Frequency/Low Severity
Plant communities include pine-oak woodlands and dry Douglas-fir sites found on south and west aspects. Surface fires are the norm with large, high severity fires rarely occurring (i.e. every 200 years). Approximately 25% of BLM land in the Planning Area is within this fire regime.

Fire Regime II. 0-35 years, High Frequency/High Severity
Plant communities include ceanothus and Oregon chaparral. Typical fire return intervals are 10-25 years. High fire severity occurs due to the presence of brushy vegetation. Approximately 25% of BLM land in the Planning Area is within this fire regime.

Fire Regime III. < 50 years, Moderate Frequency/Mixed Severity
Plant communities include mixed conifer and Douglas-fir sites found on north and east aspects. Fire severity is mixed with large, high severity fires occurring rarely (i.e. every 200 years). This fire regime exhibits fire behavior that results in mosaic patterns on the landscape with burned and unburned patches. Approximately 50% of BLM land in the Planning Area is within this fire regime.

<u>Current Conditions</u>

The natural fire regimes in the Planning Area indicate that the landscape experienced fires frequently, less than every 35 years in 50% of the area and less than every 50 years in 100% of the area (FMP, 2006). Aggressive fire suppression efforts since the 1940s have interrupted this natural fire regime, shifting the Planning Area into condition classes 2 and 3.

Condition class is a relative description of the degree of departure from natural fire regimes and generally describes how ecosystems have reacted with fire intervals outside their historic range of variability (FMP, 2006).

> *Condition Class 1* = Fire frequencies are within or near the historical range, and have departed from natural frequencies by no more than one return interval

Condition Class 2 **=** Fire frequencies and vegetation attributes have been moderately altered from the historical range, and fire frequencies have departed from natural frequencies by more than one return interval

Condition Class 3 = Fire frequencies and vegetation attributes have been considerably altered from the historical range, and fire frequencies have departed from natural frequencies by multiple return intervals

Fire History
The limited size of fires due to aggressive fire suppression efforts illustrates the interruption of the natural fire regime. Fires ranged from less than an acre to over 20,000 acres prior to Euro-American settlement in areas with similar fire regimes (UCWA, 2005). Since 1962, however, 95% of the fires were held to 10 acres or less and 100% were limited to less than 1,000 acres. Information from the Oregon Department of Forestry database shows that a total of 284 fires occurred in the Middle Cow watershed between 1962 and 2004. Table 3-4 displays fire occurrences across all ownerships in the watershed.

Table 3-4. Wildfires in the Middle Cow watershed between 1962 and 2004

Total Number of Fires	Size Class	Acres
176	A	< .25
94	B	.26 – 10
12	C	10.1 – 99
0	D	100 – 299
2	E	300 – 999
0	F	1000 - 4999
0	G	> 5000

Frequent fires that historically served as thinning mechanisms by naturally regulating stand densities were effectively being excluded from ecosystems by the 1940s (Graham, 2004). As a result of the exclusion of fire, natural levels of vegetation are shifting to overstocked stands, with an increase in the number of suppressed trees and shrub species. This dense vegetation serves as surface and ladder fuels that cause undesired changes to potential fire behavior. For example, some stands that naturally resembled Timber Group fuel models 8, 9, and 10 have shifted into Shrub Group fuel models 4 and 6, which have the potential to produce flame lengths above the 4 foot fire behavior threshold (Table 3-2).

Fire Hazard
The management activities proposed in the Action Alternatives that effect fire behavior include hazardous fuel treatments (HFT), commercial thinning prescriptions (CT, SC), and regeneration harvest prescriptions (RH, OR, SW, GS). The current conditions of the HFT stands are generally Shrub Group fuel models with associated flame lengths exceeding the 4 foot fire behavior threshold. The current conditions of the commercial thinning stands are

generally Timber Group fuel models with associated flame lengths less than 4 feet, which is within the fire behavior threshold. The current conditions of the regeneration harvest stands are generally fuel model TL4 with flame lengths of 1 to 4 feet or fuel model TU5 with flame lengths of 4 to 8 feet (Tables 3-2 and 3-5). The effects on fire behavior resulting from each of these management activities are analyzed in the Environmental Effects section.

Fire Risk
New permanent road construction proposed in the Action Alternatives may allow for increased human presence thereby potentially increasing fire risk. Despite the fairly high road densities in the Planning Area, the current fire risk is relatively low due to the lack of large population centers nearby which provide the potential for human presence. This issue is analyzed in Environmental Effects section.

Wildland-Urban Interface (WUI) areas occur where homes and other structures are adjacent to natural or undeveloped areas. Homes and communities in these areas are therefore in close proximity to wildland fuels. The presence of the homes increases the risk of wildfire ignition and their location adjacent to wildland fuels makes them vulnerable to wildfire. The Westside Planning Area resides completely within the WUI area as defined by the U.S. Forest Service, the BLM, and the Oregon Department of Forestry. WUI areas often extend to sub-watershed boundaries and incorporate all ownerships while Communities at Risk (CAR) areas are generally limited to residential private lands. There are CAR areas within this Planning Area, including the Fortune Branch area. This area is defined as the Fortune Branch Community Wildfire Protection Plan (CWPP) in the Douglas County Fire Plan. WUI, CAR, and CWPP areas are identified as high priority treatment areas to mitigate the existing fire hazard and minimize the threat of wildfire to rural communities. Hazardous fuel treatments are designed to reduce the existing fire hazard and are included in this project due to the presence of the high priority WUI, CAR, and CWPP areas.

3.2.3 Environmental Effects

Methodology

Computer modeling provides a method for comparing the effects of various management prescriptions on fire behavior. Two computer models were used in this analysis: Behave3 and Fuels Management Analyst Plus 2 (FMA^+ 2). Behave3 allows the user to input local stand characteristics and weather parameters in order to determine flame length and rate of spread. The FMA^+ 2 model uses similar input data to determine the thresholds at which surface fire would be sustained, passive crown fire would occur, or active crown fire would initiate.

Modeling runs were made using these models to compare the potential fire behavior in regeneration harvest stands in their current condition versus post-harvest condition. Runs were not made for treatment types other than regeneration harvest (RH, OR, SW, GS) because thinning treatments (CT, SC, HFT) do not reset the stands from their current seral stage, making their effects more predictable.

Runs were conducted for each of the following scenarios: (1) the current condition of the stands in their mature seral stage; (2) the condition of the stands once the regeneration harvest activity has taken place and the stand is reset to an early seral stage; (3) the stands after they have reached the mid-seral stage with a closed canopy of greater than 40%; (4) the stands after they have reached the mid-seral stage with an open canopy of less than 40%; and (5) the stands once they have reached the late seral stage.

Two runs were made for each of the five seral stages in order to show a range of potential fire behavior of Low or High (Chart 3-1). The ranges were defined by assigning two fire behavior fuel models to each seral stage. The High range for the mid-seral stages was calculated as if slash was present on site, created by brushing, pre-commercial thinning, or other maintenance activities. The Low range for the mid-seral stages was calculated as if the slash had been mitigated through fuel treatments and therefore not present on site. The range for the early seral stage was calculated by assigning fuel models that represent the range of fuel loads expected in these stands and did not factor in slash as stands younger than 10 years of age are too young to receive many maintenance treatments and when they do, not enough slash is produced to drastically increase fire behavior. The ranges for late and mature seral stages were calculated by assigning fuel models that represent the range of fuel loads expected in these stands and did not factor in slash as fuel treatments to mitigate activity slash are generally implemented within six months to a year and therefore have short term effects.

Fuel

The fuel models used to run the computer models (2005 fuel models) differ from those discussed in the Affected Environment section (1982 fuel models). The 2005 set of fuel models offers a greater selection allowing the user to assign a model that more accurately represent the actual stands. Table 3-5 shows the cross-walk from the 1982 fuel models to the 2005 fuel models used to analyze the effects of regeneration harvest activities on fire behavior. Table 3-6 shows the flame lengths expected for each of the 2005 fuel models used in the analysis regarding effects of regeneration harvest on fire behavior.

Table 3-5. Fire Behavior Fuel Model Cross-Walk

1982 Fuel Model Group	1982 Fuel Model	2005 Fuel Model Group	2005 Fuel Model
Shrub	6	Shrub	SH2, SH4
Timber	8	Timber Litter	TL4
Timber	9	Timber Litter	TL8
Timber	10	Timber Understory	TU5
Slash	11	Slash/Blowdown	SB1, SB2
Slash	12	Slash/Blowdown	SB1, SB2
Slash	13	Slash/Blowdown	SB2

Weather

Weather data was collected from a local RAWS (Calvert remote automated weather station) to determine the 98 to 100 percentile range of extreme weather in the area. The extreme range was chosen in order to produce a worse case scenario of fire behavior in the area. The range of weather was taken for the last 100 days of fire season (from mid July to the end of October) because this is the hottest and driest time of the year and therefore the most likely time period to produce extreme fire behavior.

Topography

The topography in the Planning Area varies greatly in slope, aspect, and elevation. Slope is an important factor in fire behavior and a topographical parameter needed to run Behave3 computer models. Slope was held constant at 50% in the Behave3 modeling runs as a mid-point in the range of slope within the Planning Area.

3.2.3.1 Direct Effects and Indirect Effects

<u>Fire Hazard</u>

Hazardous fuel treatments (HFT) are designed to reduce the existing fire hazard posed by dense younger stands and older stands with dense understories. This is accomplished by increasing the spacing between trees in the younger stands through thinning and by thinning the understories of the older stands. These treatments reduce the amount of surface and ladder fuels present, thereby reducing the existing fire hazard.

There are short term and long term effects of implementing hazardous fuel treatments. In the short term, the slash created from thinning could potentially transition the stands from their current Shrub Group fuel models 4 and 6 to Slash Group fuel model 11, with 12-15 tons of slash produced per acre. This transition does not necessarily translate into an increase in fire hazard however, as fuel models 4 and 6 both produce flame lengths above the 4 foot threshold and fuel model 11 does not (Table 3-2). Short term refers to the six month to two year period from when the slash is produced to the time it is mitigated by being disposed of through removal and/or prescribed fire.

In the long term, after the slash is mitigated, the fire hazard in these stands is decreased because implementation of these treatments results in a Timber Group fuel model 8 or 9. The stands prior to treatment have the potential to far exceed the fire behavior threshold of a 4 foot flame length, while the stands after treatment fall within the threshold with flame lengths of only 1 to 2 feet (Table 3-2). These treatments are considered to have long term effects because once the initial treatment is completed (i.e. the slash is burned or otherwise removed from the site) the stands are expected to be maintained through subsequent treatments such as underburning.

Alternative 1

No hazardous fuel treatments would take place under this alternative. There would be no long term decrease in the existing fire hazard from thinning dense stands and it is expected that the fire hazard would increase under this alternative in the Planning Area due to the trends discussed in the current conditions section and the continued exclusion of fire.

Alternative 2 and 3

Under both of these alternatives, 988 acres are proposed to receive hazardous fuel treatments. The short term effects of slash present on site on these acres does not necessarily translate into an increased fire hazard, in terms of flame length, compared to the stand conditions prior to treatment. In the long term, implementing the proposed hazardous fuel treatments would decrease the existing fire hazard on the 988 acres proposed to receive these treatments. The effect is the same for both Alternatives 2 and 3 because 988 acres are proposed for hazardous fuel treatments under both of these Action Alternatives.

Commercial thinning (CT, SC)

Although the commercial thinning prescriptions proposed in the Action Alternatives are not specifically designed to affect fire behavior, they do have short term and long term effects. The short term effects may result in an increased fire hazard because the slash created from thinning the stands could potentially transition the stands from their current Timber Group fuel models 9 or 10 to Slash Group fuel models 11 and 12, with 12-35 tons of slash produced per acre. This may translate into increased fire behavior as fuel models 9 and 10 produce flame lengths in the realm of the 4 foot threshold while fuel model 12 can produce 8 foot flame lengths (Table 3-2). Short term refers to the six month to two year period from when the slash is produced to the time it is disposed of by removal and/or prescribed fire.

In the long term, after the slash is mitigated, the potential flame lengths in these stands may generally decrease compared to their current condition. Stands prior to thinning generally resemble Timber Group fuel models 9 and 10 (2 to 4 foot flame lengths), whereas stands after thinning generally resemble a fuel model 8 (1 foot flame lengths). This does not necessarily translate into a decrease in overall fire hazard though, because flame lengths are generally below the 4 foot threshold in the stands prior to thinning.

Alternative 1
No commercial thinning would occur under this alternative therefore the short term increase in fire hazard due to created slash would not occur. It is expected that the existing fire hazard would increase under this alternative in the Planning Area due to the trends discussed in the current conditions section and the continued exclusion of fire.

Alternative 2 and 3
Commercial thinning and selective cut prescriptions open forest canopies by reducing canopy closures to 40 to 60 percent. Concerns have been raised regarding the opening of forest canopies and related increases in fire hazard. Opening canopies can increase wind speeds and lower fuel moistures in the stand, which tends to exacerbate fire behavior. Also, opening canopies allows brush to grow in the understory, which may increase surface and ladder fuels, depending on stand condition prior to thinning. The probability of these concerns occurring is heavily dependant on site-specific variables such as slope, aspect, elevation, position on slope, adjacent stand conditions, and many others.

Regardless of these variables, fuels are the critical factor in influencing fire behavior. Surface fuels may be increased in the short term due to the creation of slash, as discussed above, but once the slash is mitigated the stand experiences an overall reduction in surface fuels. Ladder fuels are reduced when the limbs and branches are removed from the site as trees are removed during the thinning process. Aerial fuels are removed as a function of opening the canopy during thinning. If no subsequent treatment occurs in the stand after thinning, such as fuel treatments to mitigate the slash or future thinning or brushing treatments to maintain the open stand conditions, the concerns listed above could lead to increased fire behavior. However, the stands proposed for commercial thinning treatments in this Planning Area are managed stands within the matrix land allocation and within the WUI, meaning it is expected that these stands would receive fuel treatments to mitigate the slash as well as future treatments, either silvicultural or hazardous fuel related, that would maintain the stand to prevent overstocking and future accumulation of fuels (BLM, 1994). Also, studies show that thinning followed by sufficient treatment of surface fuels reduce the overall expected fire behavior, outweighing the changes in fire weather factors such as wind speed and fuel moisture (Weatherspoon, 1996).

In summary, the short term effect of commercial thinning treatments may be an increased fire hazard on 1,859 acres under Alternative 2 and 1,671 acres under Alternative 3 due to the presence of slash on site. This increase is considered short term until the slash is mitigated which generally occurs within six months to two years after the harvest activity takes place.

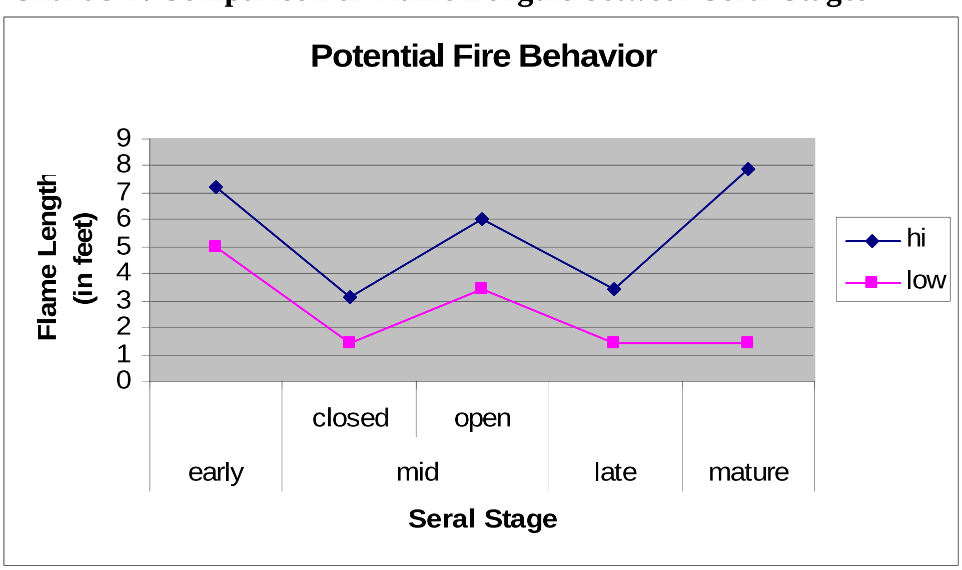
Regeneration harvest (RH, OR, SW, GS)

The purpose of this analysis is to demonstrate the effects of regeneration harvest activities on fire hazard as mature seral stage stands are reset to early seral stage stands. The range of flame length was calculated using the fire behavior computer models and parameters described in the methodology section. The range for the early seral stage was derived based on stand conditions as they change between the first and tenth year of growth. For the low end of the early seral stage, the 2005 fuels model (Table 3-5) SH2 was used, and for the high end SH4 was used (Chart 3-1). TL4 was used for the low end of the mature seral stage and TU5 for the high end, based on the range of conditions currently found in mature seral stage stands (Chart 3-1). Fuel models SB1 and SB2 were used to represent slash on site.

Table 3-6. 2005 Fuel Models with Flame Lengths

2005 Fuel Model	Flame Length (in feet)
SH2	1-4
SH4	4-8
TL4	1-4
TU5	4-8
SB1	1-4
SB2	4-8

Chart 3-1. Comparison of Flame Lengths between Seral Stages



Although the regeneration harvest prescriptions proposed in the Action Alternatives are not specifically designed to affect fire behavior, they do have short term and long term effects. In the short term, the slash created causes the stands to transition from their current fuel models TL4 or TU5 to SB1 or SB2, with potentially over 35 tons of slash produced per acre. This transition does not necessarily translate into an increase in fire hazard however, as the flame lengths associated with these fuel models are comparable (between 1 and 8 feet). Short term refers to the six month to two year period from when the slash is produced to the time it is mitigated by being disposed of through removal and/or prescribed fire.

In the long term, concerns have been raised, at both the stand level and landscape level, regarding older, mature stands being replaced by younger plantations through the implementation of regeneration harvest prescriptions. The long term, in this context, refers to the time between when the slash is mitigated to the time when the stand reaches the mid-seral stage.

At the stand level, the concern seems to be that younger trees are more susceptible to fire than older trees. This is generally true because younger trees are smaller, both in height and diameter, than older trees and therefore require a lesser degree of fire intensity and shorter flame lengths to sustain lethal damage from fire (Agee, 1993).

At the landscape level, the concern seems to be that the existence of plantations may create the potential for catastrophic fires. The probability of this concern occurring is heavily dependant on many spatial and temporal variables, such as the location of the plantations in respect to slope, aspect, elevation, and position on slope, along with weather conditions occurring as the fire ignites and advances. Other critical factors in catastrophic fire development relate to the availability of fire suppression resources, their response time to the fire, and their effectiveness given the environmental factors present.

Plantations, although they may present an area with increased fire rates of spread due to the presence of flashier fuels, may also provide areas in which effective and efficient fire suppression operations can occur (Martin, 2006). For example, air attack operations with air tankers and helicopters are generally less effective in stands with taller trees and closed canopies. Also, access through managed areas is already in existence, meaning mechanical equipment such as dozers can be used in a much more efficient manner. Existing fire barriers, such as roads and firelines, may also already exist in managed areas, meaning fire control lines take less time to construct than in older stands, in most instances (Martin, 2006).

Scientific evidence exists supporting the notion that plantations are vulnerable to fire and may exacerbate fire behavior, particularly during times of dry conditions and in stands that have received slash-producing maintenance treatments (such as pre-commercial thinning) where the slash remains on site and is not mitigated (Martin, 2006). However, in most instances, monitoring plots taken in older stands in the local area reveal that the number of small trees (up to 8 inches dbh) with varying heights are at such levels of abundance that these stands are also vulnerable to fire and have the potential to produce catastrophic fire behavior during dry conditions (Martin, 2006). As Chart 3-1 shows, the high end of the range for flame lengths in mature stands (8 feet) exceeds the high end in early seral stands (7 feet) and mid-closed stands (3 feet) that are indicative of plantations.

Alternative 1

No regeneration harvest would occur under this alternative. It is expected that the existing fire hazard would increase under this alternative in the Planning Area due to the trends discussed in the current conditions section and the continued exclusion of fire.

Alternatives 2 and 3

The effect of regeneration harvest activities may be a potential increase in fire behavior due to the presence of slash on site. This may effect up to 1,515 acres under Alternative 2 and 1,338 under Alternative 3. This does not necessarily translate into an overall increase in fire hazard however, as the stands prior to harvest have the potential to produce flame lengths from 1 to 8 feet, which is comparable to the stands with slash on site and the stands once they have been reset to an early seral stage until they mature into mid-seral stage.

<u>Fire Risk</u>

As explained in the Affected Environment section, fire risk is the probability of a fire starting which is determined by the presence of ignition sources and is proportional to human presence. New permanent road construction has the potential to increase fire risk because new roads allow for an increase in human presence by providing easier access into previously inaccessible areas. The miles of new road construction and increased human presence do not correlate on a one-to-one basis because many factors aside from access contribute to increased human presence. The most important factor is how appealing the areas are into which the new roads provide access. The new roads in the Action Alternatives are proposed in order to access timber sale units. These are generally short spur roads that do not lead to appealing recreational areas. So, while there is new permanent road construction proposed, it is not likely that fire risk would be affected by a large increase in human presence.

Some of the new permanent road construction would connect existing roads along the ridge that divides the Cow Creek drainage from the Windy Creek drainage. Because fires tend to run uphill, ridgelines are often used by fire suppression personnel as areas to build effective control lines. Connecting the existing ridgeline road segments together would be beneficial from a fire suppression standpoint.

Alternative 1

No new permanent road construction would take place under this alternative. There would be no benefits to fire suppression personnel of having access along the ridgeline between Cow Creek and Windy Creek.

Alternatives 2 and 3

The minimal amounts of new permanent road construction proposed, combined with the correlation between roads and fire risk explained above are not likely to cause any increase in fire risk under either of the Action Alternatives.

The ridge road between Cow Creek and Windy Creek, proposed under both alternatives, would provide a strategic location for fire suppression personnel, which is especially critical in this Planning Area due to the presence of WUI, CAR, and CWPP areas located on either side of this ridgeline.

3.2.3.2 Cumulative Effects

Fire Analysis Area
The fire analysis area under consideration in this Cumulative Effects section includes the WUI area within the Middle Cow watershed and the area within the Middle Cow LSR Planning Area boundary. This area incorporates portions of the Whitehorse Creek sub-watershed, the majority of the Quines Creek sub-watershed, all of the area within the Fortune Branch, Windy Creek, and McCullough Creek sub-watersheds, and the southeastern portion of the Langdon sub-watershed (ODF map, 2004).

The proposed treatments in the Middle Cow LSR project are considered in this Cumulative Effects section because these two projects are being planned concurrently and both are within the fire analysis area. The Middle Cow LSR project proposes approximately 2,500 acres of hazardous fuel treatments and approximately 250 acres of commercial thinning within the fire analysis area. The Fortune Branch CWPP is also within the fire analysis area but the effects of this fact are not considered in this analysis because the area is currently in the planning process, making the number of acres treated and the implementation time frame indeterminable at this time.

<u>Fire Risk</u>

While the construction of new roads in general potentially increase fire risk by allowing access into areas previously not accessible, there is no affect on fire risk expected from the proposed new permanent road construction in the Westside project for the reasons discussed in the Direct and Indirect Effects section. Also, the Middle Cow LSR project proposes no new permanent road construction therefore there is no cumulative effect on fire risk.

The cumulative effect of adding new stretches of road along the ridgeline between Windy Creek and Cow Creek to the existing disconnected stretches of road would be beneficial from a fire suppression standpoint because this action would allow access into a location that is conducive to building effective fire control lines.

<u>Fire Hazard</u>

This Cumulative Effects section addresses the spatial and temporal effects of the alternatives on fire hazard by performing the following analyses: determining the short term and long term effects of all of the treatment types combined (RH, OR, SW, GS, CT, SC, HFT) that are proposed both in the Westside project and in the Middle Cow LSR project; and describing the perspective of the RMP/EIS on the regeneration harvest activities proposed in the Westside project in the context of regeneration harvest on the Medford District within the past decade.

Activity slash may occur on approximately 8,099 acres under Alternative 2 and approximately 7,734 acres under Alternative 3. These acres include all of the HFT acres and commercial harvest prescription acres in both the Westside Project and the portion of Middle Cow LSR project within the fire analysis area. It is not expected that all of these acres would have activity slash present concurrently because the commercial harvest activities are proposed to take place through several timber sales over a two to three year period and implementation of the hazardous fuel treatments are contingent upon funding, meaning they may not occur all in the same fiscal year.

Also, the presence of slash does not translate directly into an increased fire hazard on all of these acres because the HFT units and regeneration harvest units have the potential to produce flame lengths in their current condition comparable to those produced when slash is on site (1 to 8 feet). This is generally not the case in the commercial thinning (CT, SC) units though, which may have an increased fire hazard due to slash on site (flame lengths over 4 feet) that is not comparable to their current condition (flame lengths under 4 feet). Alternative 2 proposes 1,859 acres and Alternative 3 proposes 1,671 acres of commercial thinning. Similar commercial thinning treatments are proposed in the Middle Cow LSR on approximately 1,236 acres. The cumulative effect may be a short term increase in fire hazard due to the presence of slash in the commercial thinning units on approximately 3,095 acres under Alternative 2 and approximately 2,907 acres under Alternative 3, including the commercial thinning units in the Middle Cow LSR project that fall within the fire analysis area

Hazardous fuel treatments decrease the fire hazard in the long term, once the slash is mitigated, by reducing the surface and ladder fuels. These stands prior to treatment have the potential to produce flame lengths above the 4 foot flame length threshold and after treatment generally resemble fuel models with flame lengths below the threshold. The Action Alternatives propose 988 acres of hazardous fuel treatments in the Westside Planning Area. The Middle Cow LSR project proposes similar treatments on approximately 2,501 acres. Also, approximately 250 acres of fuel treatments have already been implemented within the fire analysis area under other fire management projects since implementation of the National Fire Plan began in 2000. The cumulative effect of these combined activities may be a long term decrease in fire hazard on approximately 3,740 acres under either Action Alternative.

In regard to the issue addressed in the Direct and Indirect Effects section of creating plantations prone to catastrophic fire, there are negative implications at the stand level resulting from transitioning older stands to younger stands. The Medford District RMP/EIS took these implications into account, along with the expected condition of private lands, when analyzing for the effects of regeneration harvest. The RMP analyzed the effects of

1,140 acres of regeneration harvest and overstory removal on a District-wide average annual basis the first decade. Less than 500 acres annually of regeneration harvest have been implemented District-wide in the past decade. These acres combined with the acres proposed for regeneration harvest in the Westside Planning Project under either Action Alternative fall below the number of acres analyzed for in the RMP/EIS. No regeneration harvest activities are proposed in the Middle Cow LSR project.

In summary, the cumulative effect may be a short term increase in fire hazard due to the presence of slash on site on approximately 3,095 acres under Alternative 2 and 2,907 under Alternative 3. The long term cumulative effect may be a decrease in fire hazard on approximately 3,740 acres under either Action Alternative. Conversely, the fire hazard is expected to increase in the long term due to the trends discussed in the current conditions section and the continued exclusion of fire on up to 8,099 acres under the No Action Alternative.

3.3 Special Status Wildlife Species

(Threatened, Endangered, Sensitive)

3.3.1 Northern Spotted Owl (Threatened)

3.3.1.1 Affected Environment

The Planning Area is located within the Middle Cow Watershed, which contains a mixture of seral stages, including approximately 22,000 acres of mature and old-growth forest habitat (about 50% of the 45,510 acres in federal ownership,USDI, 1999, p.34) used by northern spotted owls. The USFWS Section 7 Cow-Upper watershed baseline suitable (late-successional) habitat is 43,242 acres (RORSISBLM FY 06-08 BA, p. BA-47).

Extensive harvesting on BLM occurred in the Planning Area prior to the 1990 listing of the spotted owl as a threatened species, and the implementation of the NFP in 1994. The Middle Cow Creek Watershed Analysis (1999, p.36) notes that the late-successional stands in this watershed are highly fragmented and frequently isolated from other late successional stands because of the checkerboard pattern of federal land ownership and past logging practices. Harvesting on private lands continues to be extensive. Most private land has been intensively harvested, much of it in the last few decades (satellite change detection data 1974-2002). Other past events, such as quarry development, road building, rock slides, and fire (Table 3-8) have also contributed to a total of at least 23 % (satellite imagery change detection data) of the Fortune, Windy, and Quines 6th field sub-watersheds being converted to presently unsuitable spotted owl habitat.

One of the functions of matrix lands is to serve as connectivity between late-successional reserves (USDA/USDI. 1994b, p. B-43). Owl sites found after January 1994 receive no mandatory protection, except for the nest site and seasonal restriction (USDA/USDI 2003 BA, p. 72). Demographic data from northern spotted owls in the Klamath Demographic Study Area collected from 1985 – 2003 indicate that populations appear to be stable in the

Klamath study area as a result of high survival and number of young produced by territorial females, which were stable over the period of the study.

The Bureau of Land Management (BLM), Forest Service (FS), and US Fish and Wildlife Service (USFWS) have conducted a coordinated review of four recently completed reports containing information on the NSO. The reviewed reports include the following:

- *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney et al. 2004);
- *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony et al. 2004);
- *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and
- *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005).

Although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with barred owls, and habitat loss due to wildfire were identified as current threats; West Nile virus and Sudden Oak Death were identified as potential new threats. Complex interactions are likely among the various factors. The status of the NSO population, and increased risk to NSO populations due to uncertainties surrounding barred owls and other factors, were reported as not sufficient to reclassify the species to endangered at this time.

The effects on NSO populations identified in the four reports are within those anticipated in the RMP EIS, and that the RMP goals and objectives are still achievable in light of the information from the reports (BLM, 2005).

Northern spotted owl suitable habitat includes stands suitable for nesting, roosting, and foraging. There are two categories of suitable habitat. Habitat 1 conifer stands satisfy the daily and annual needs of the owl for nesting, roosting and foraging. These stands generally have a multilayered canopy with large trees in the overstory and an understory of shade tolerant conifers and hardwoods. Canopy closure generally exceeds 70%, and average DBH is generally 21 inches or greater. Habitat 2 suitable habitat includes conifer stands with understory vegetation or coarse woody debris which provide roosting and foraging opportunities but lack the necessary structure for consistent nesting. These stands have less diversity in the vertical structure and canopy closure generally exceeds 70% and average DBH is 11- 21 inches. Units were either field-reviewed or analyzed using aerial photographs to determine if they met the definition of suitable habitat. Dispersal (non-suitable) habitat includes conifer stands with trees greater than or equal to 11” dbh and canopy closure of 40-60%.

Thirteen known spotted owl centers (Bear Windy, Upper Fortune, Fortune Branch, JBL, Mickey, Swamp Gas, Swampford, Tunnel Ridge, Free Fall, Fir Point, Woods Creek South, Lawson Creek, and State Road) are within the Planning Area. Other owl centers adjacent to the Planning Area occur, and the resident owls may utilize suitable habitat within the Planning Area. One hundred-acre core areas have been designated for JBL, Mickey, Swampford, Swamp Gas, Tunnel Ridge, and Fir Point owl sites. Three known barred owl sites have been located within the Planning Area near the Swamp Gas, Lawson Creek and Tunnel Ridge activity centers. There no other known sites. All owl sites are visited to protocol every year.

Table 3-7 shows visit effort and owl status determination for 2001-2005.

Table 3 - 7 Northern Spotted Owl Visit Effort and Status Determination for 2001-2005.

Owl Site	2001	2002	2003	2004	2005
Fir Point (100 acre core)	Pair Present Not Nesting	Pair Present Not Nesting	Male Present	Pair Present Not Nesting	Pair Present Not Nesting
JBL (100 acre core)	Pair Present Not Nesting	Pair Nested 1 Juvenile	Pair Present Not Nesting	Male Present	Pair Present Not Nesting
Tunnel Ridge (100 acre core)	No Response	No Response	No Response	No Response	No Response
Swamp Gas (100 acre core)	Pair Nested 1 Juvenile	Pair Nested 2 Juveniles	Male	Male	No Response
Mickey (100 acre core)	Pair Nested No Young	Pair Nested 2 Juveniles	Male	Pair Nested No Young	Pair Nested No Young
Swampford (100 acre core)	Pair Nested Not Nesting	Pair Nested 1 Juvenile	No Response	Male	Pair Present Not Nesting
Lawson Creek	Male	Male	Male	No Response	No Response
Free Fall	No Response	Pair Present Not Nesting	No Response	No Response	No Response
Fortune Branch	Male	Pair Nesting 1 Juvenile	Pair Present Nesting Unknown	Pair Present Not Nesting	No Response
Upper Fortune			New Site Pair Nesting No Young	Pair Present Not Nesting	Pair Present 2 Juveniles
Bear Windy	Pair Nested 2 Juveniles	Pair Nested 2 Juveniles	Pair Nested 1 Juvenile	Pair Nested 2 Juveniles	Pair Nested No Young
Woods Creek South	Pair Nested No Young	Pair Nested No Young	Pair Nested No Young	Pair Nested 2 Juveniles	Pair Nested 2 Juveniles

Owl Site	2001	2002	2003	2004	2005
State Road	No Response	No Response	No Response	No Response	No Response

In the Planning Area, only two of thirteen northern spotted owl activity centers successfully produced young within the last three years. Lack of consistent nesting and low reproduction are indicators of low-quality nesting conditions in the Planning Area. The generally poor quality of nesting habitat is also identified in the Middle Cow Creek watershed analysis (USDI 1999, p.43) in which it is noted that sites in the center of the watershed, where the Planning Area occurs, has had less stable and less productive sites than in the eastern and western portions of Middle Cow Creek.

3.3.1.2 Effects of Alternative 1 (No Action) on owl habitat

Direct and Indirect Effects

Under the No Action Alternative, no harvest would occur. Growth of late-successional and old-growth forest habitat would continue in the Planning Area. If harvesting is deferred, older stand development would additionally contribute greater amounts of standing and downed wood. However, stands would likely be reviewed under future actions for harvesting and would not likely support additional productive owl sites. With no thinning, the trajectory of some stands to grow into better suitable habitat would continue at a slower rate than if stands were thinned. The lack of fuels treatments would increase the risk of stand replacement fire within the Planning Area (see section 3.2.2.). Such a fire would reduce the amount of suitable owl habitat, depending on the extent and intensity of the fire.

Temporary and permanent right of way construction would continue on BLM and private lands to allow private harvesting, resulting in removal of suitable and dispersal habitat. The survival of spotted owl sites within the Klamath Demographic Study Area would remain stable, and contribute to a stable population within the Klamath Province (USDA/USDI 2004b).

3.3.1.3 Effects of Alternative 2 (Proposed Action) on Owl Habitat

Direct and Indirect Effects

All the proposed harvest units under Alternative 2 contain suitable habitat or dispersal habitat and are assumed to be used by adjacent resident owls, or by dispersing owls.

Effects on owl habitat at the stand level vary depending on the proposed treatment. NGFMA regeneration harvest units (retaining 6 to 8 trees per acre over 20”dbh) would remove suitable nesting, roosting, and foraging habitat, to become non-suitable habitat for at least 60-80 years. Wide spacing of stems would open the canopy and alter prey habitat until more structure grew back. Commercial thinning units that maintain 40 percent canopy closure would take 10-20 years to return to suitable habitat condition.

Under the Proposed Action units 3-19, 3-5, 3-5A, 4-4, 4-20, 4-20S, 4-24, 4-33, 5-1, 5-1A, 5-12, 5-14, 5-15, 5-18, 5-23, 5-26, 8-2, 9-1, 9-6, 9-17, 9-19, 10-1, 11-1, 17-4, 17-7, 18-2, 18-12, 19-2, 29-4, 31-3, 33-2A, 33-2B, 3-1W, 5-2W, 10-1, 10-1W, 10-2W, 11-2W, 11-3W, 14-2W, 15-1, 15-2, 15-8, 15-9, 20-1, 21-15, 21-15A, 21-8, 23-2, 24-4, 25-1, 27-1, 29-1W, 29-3W, 34-2, 5-7S, 3-8SW, 3-11SW, 1-4S, and 9-7S would remove approximately 1,515 acres of suitable habitat by RH, OR, GS and SW treatments.

Units 3-8, 3-10, 3-11, 4-7, 4-8, 5-4, 5-27, 8-2A, 9-1, 9-2, 9-3, 9-18, 11-2W, 17-1,18-14, 19-1, 19-2, 31-8, 1-1, 1-2, 3-4W, 13-1, 13-2, 13-3, 15-3, 21-7, 22-2, 23-3, 23-5, 24-5, 27-3, 27-6, 34-1, 34-3, 35-1, 4-3S, 4-19S, 4-20SA, 4-21S, 5-5S, 5-9S, 5-10S, 5-21S,10-2SW, and 1-14S 8-1 would downgrade approximately 1,567 acres of suitable habitat to dispersal habitat by commercial thinning. Units 9-1A, 5-8S, 31-1, and 33-2C would degrade approximately 292 acres of dispersal habitat through commercial thinning and sanitation/root rot treatments (not in suitable condition).   Commercial thinning would reduce future recruitment of snags and resulting down wood created from snags by removing suppressed or defective trees, and would decrease the future quality of the habitat to provide optimal nesting structure, and optimal prey abundance.

The USFWS Section 7 Watershed (Cow-Upper) encompasses the West Fork Cow, Middle Cow and Upper Cow 5th field watersheds. The removal and downgrading of suitable habitat under Alternative 2 would likely impair the ability of at least some of the owls (see Table 3.7) in the planning area, to breed, feed, and shelter in the Cow-Upper watershed. The removal and downgrading of suitable habitat under Alternative 2 would also likely reduce the ability of owls nesting in bordering portions of adjacent watersheds by reducing available habitat supporting roosting and foraging within owl home ranges, and may reduce future alternate nest site selection. The ultimate fate of individual owls in the Planning Area (see Table 3.7) or owls in adjacent watersheds utilizing habitat in the Planning Area, as a result of the proposed habitat modification, is unknown due to the variability in individual owl response to habitat modification, the unknown actual home range and habitat use of individual owl sites, stochastic effects and complications that other influences (e.g. disease and barred owls) might have. Alternative 2 was designed under the guidelines of the NFP and RMP, and Project Design Features (Section 2.3.9.1) would minimize impacts to the spotted owl. Resident spotted owls using the treated stands would be anticipated to expand home range size to compensate for habitat loss and degradation (Meiman 2003, pp. 1254-1262).

The harvest of 1,515 acres of late-successional suitable owl habitat through RH, GS, OR, and SW treatments would result in a loss of nesting habitat available for alternate nesting sites, reduced prey availability for adults and young, and loss of habitat available for dispersing owls. However, these stands would provide woodrat habitat for 5-10 years (Carey et. al. 1999) for foraging owls along the edges of regeneration harvested units and would develop into dispersal habitat in approximately 30 years.

The Fish and Wildlife Service analyzed take of northern spotted owls by considering the removal, downgrading, or degradation of all suitable and dispersal habitat acres at the Cow Upper Section 7 Watershed level in the BO (Log #: 1-15-06-F-0162).

Harvesting late-successional stands would reduce the viability of owl sites on matrix lands as anticipated in the NFP (USDA/USDI. 1994a 3&4-241). The effects of loss, degradation and disturbance of habitat due to harvesting, fire, and road construction, manifested in the spotted owl population decline rate, are not greater than was analyzed in the RMP (USDA/USDI 1994, p. 4-78) and NFP (USDA/USDI 1994a, pp. 3&4 -211-234)

Habitat affected by construction of 0.5 miles of permanent roads, approximately 0.5 acres, cannot be expected to return to a functional habitat condition. Habitat affected by construction of five and one-half miles of temporary roads, approximately five acres, which would be decommissioned after use, can be expected to return to a functional dispersal condition of 40 per cent canopy closure and trees averaging 11”dbh or greater in approximately 50-60 years.

The 988 acres of slash, pile, pile burn, and underburn fuels treatments are expected to degrade in the short-term (3-5 years) suitable and dispersal spotted owl habitat. Habitat degradation would primarily occur through removal of 1”-7” fine fuels which are used for denning and nesting by a primary northern spotted owl prey species, the bushy-tailed woodrat, resulting in an expected decrease in available prey. Although there would be short-term impacts, it is expected they would be outweighed by the long-term benefits for northern spotted owls due to the reduction of risk of stand-replacement wildfire as a result of these fuels treatments.

The Proposed Action would remove 1,515 acres of suitable habitat and downgrade an additional 1,567 acres of habitat through timber harvest. There would also be 292 acres degraded to dispersal habitat. Additionally, the project would degrade 988 acres of suitable and dispersal habitat through fuels treatments, and remove 5 acres of habitat through placement of roads. This level of impact to northern spotted owl habitat in the NGFMA Planning Area was anticipated in the NFP and RMP. The Medford ROD/RMP assumed an average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP, p. 9-11) and the effects to suitable habitat was analyzed on pages 4-73 and 4-74 of the RMP/EIS, based on the assumed level of harvest. The actual amount offered for sale on the Medford District from 1995 to 2004 fell far below this amount, as it was less than 500 acres of regeneration harvest and overstory removal per year. Given this fact, the amount of harvest under the Proposed Action would maintain harvest levels within the harvest assumptions of the RMP, and hence within the level of impact to northern spotted owl habitat in the NGFMA Planning Area as anticipated in the NFP and RMP. The reduction of suitable habitat and degradation to owl sites within matrix land is within the assessment of the NFP and the FY 06-08 Biological Assessment, and a shift to increasing numbers of owl sites in maturing large reserves is expected to contribute to the recovery goals and conservation needs of spotted owls by providing multiple clusters of breeding spotted owls (RORSISBLM FY 06-08 BA, pp. 29-30).

Cumulative Effects

Cumulative effects in the Planning Area result from the incremental impact of the Proposed Action, added to other past, present, and reasonably foreseeable actions regardless of land ownership. The majority of remaining older forest in this watershed is on public lands managed by BLM. Past activities have resulted in habitat loss and have changed the distribution and abundance of many wildlife species in the Planning Area. Species associated with younger forested conditions have benefited from these changes. Habitat modification and removal with fewer protection measures would continue on private or county lands, which negatively affect late-successional dependent wildlife species on these lands.

Extensive harvesting on BLM occurred in the Planning Area prior to the 1990 listing of the spotted owl as a threatened species, and the implementation of the NFP in 1994. The Middle Cow Creek Watershed Analysis (1999, p.36) notes that the late-successional stands in this watershed are highly fragmented and frequently isolated from other late successional stands because of the checkerboard pattern of federal land ownership and past logging practices. Harvesting on private lands continues to be extensive. Most private land has been intensively harvested, much of it in the last few decades (satellite change detection data 1974-2002). Other past events, such as quarry development, road building, rock slides, and fire (Table 3-3) have also contributed to a total of at least 23 % (satellite imagery change detection data) of the Fortune, Windy, and Quines 6th field sub-watersheds being converted to presently unsuitable spotted owl habitat.

The RMP/EIS assumed that in the future nonfederal lands would have no suitable habitat (RMP/EIS, 4-73) due to 50-80 year rotations on private lands, but are expected to provide some dispersal habitat. The cumulative effect of harvesting from private lands and the Proposed Action is less than what was anticipated in the RMP/ROD. BLM administered lands assumed average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP. p, 9-11). The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres (RORSISBLM FY 06-08 BA, p. 47). The cumulative removal and downgrading of 3,087 acres of suitable habitat, combined with other foreseeable projects in this watershed through Fiscal Year 2008 (estimated 2,597 acres; e.g., Middle Cow Creek LSR and Boney Skull), is approximately 13% (5,684 of 43,242 acres) of the current suitable habitat in this Section 7 watershed. In addition to the cumulative effects of activities reducing available habitat supporting the local owl population within the Cow-Upper Section 7 watershed, habitat within the Planning Area may also be utilized by owls within adjacent 5th field watersheds. The Roseburg District BLM's Can-Can Environmental Assessment (EA #OR 105-05-06) analyzed the cumulative effects of habitat loss on the spotted owl, and stated that the stability of the population within the Klamath Mountain physiographic province was within the predictions of the Northwest Forest Plan (EA p. 34).

Alternative 2, combined with the foreseeable effects of the Roseburg District BLM's Screen Pass Timber Sale, which BLM analyzed in the Can-Can EA, would further reduce suitable habitat available for owls, and contribute to the reduced viability of matrix land owl sites utilizing both project areas, through reduction of available habitat utilized for breeding, nesting, feeding, sheltering, or dispersing. The ultimate fate of individual owls in the Planning Area (see Table 3.7) and owls in adjacent 5th field watersheds utilizing habitat in the Planning Area, as a result of the combined effects of both projects is unknown due to the variability in individual owl response to habitat modification, the unknown actual home range and habitat use of individual owl sites, stochastic effects and complications that other influences (e.g. disease and barred owls) might have. Nonetheless, the combined consequences of these projects' harvest of late-successional stands, including the reduced viability of owl sites on matrix lands, were anticipated in the NFP (USDA/USDI. 1994a 3&4-241). Under the NFP, only matrix based spotted owl sites identified as of January 1994 received 100 acre residual habitat areas, which were not considered adequate to maintain reproductive owl pairs (USDA/USDI 1994 p.3&4-241) and provide for the long-term needs of owl pairs. The function of matrix lands is to serve as connectivity between late-successional reserves (USDA/USDI. 1994b vol 2, p. B-43). Remaining nesting habitat on private land is not expected in the future to be suitable habitat, given a stand age rotation of 60 years (RMP/EIS, pp.4-5).

The Biological Assessment (RORSISBLM FY 06-08 BA p. 42) stated that no more than 13 percent of the suitable habitat would be removed from any Section 7 Watershed and that reduction was anticipated in the NFP. Cumulative effects on the spotted owl sites in or adjacent to the Planning Area affected by the Proposed Action, when added to any cumulative effects of the Proposed Action and the Roseburg District BLM's Screen Pass Timber Sale are not expected to change the stable population trend in the Klamath Province as noted in 3.3.3.1 above.

3.3.1.5 Effects of Alternative 3 on Owl Habitat

All the proposed harvest units contain suitable habitat or dispersal habitat and are assumed to be used by adjacent resident owls in or adjacent to the Project Area, or by dispersing owls.

Under Alternative 3 units 3-19, 3-5, 3-5A, 4-4, 4-20S, 4-33, 5-18, 8-2, 9-6, 9-17, 9-19, 10-1, 11-1, 17-4, 17-7, 18-12, 31-3, 33-2A, 33-2B, 3-1W, 5-2W, 10-1, 10-1W, 10-2W, 11-2W, 11-3W, 14-2W, 15-2, 15-8, 15-9, 20-1, 21-15, 21-15A, 21-8, 23-2, 24-4, 25-1, 27-1, 29-1W, 29-3W, 34-2, 5-7S, 3-8SW, and 3-11SW would remove approximately 1,338 acres of suitable habitat by RH, GS, OR, and SW treatments. Units 3-8, 3-10, 3-11, 4-8, 5-4, 5-27, 9-1, 9-2, 9-18, 17-1,18-14, 19-1, 19-2, 31-8, 1-1, 3-4W, 13-1, 13-3, 21-7, 22-2, 23-3, 23-5, 24-5, 27-3, 27-6, 34-1, 34-3, 35-1, 4-3S, 4-19S, 4-20SA, 4-21S, 5-10S, 5-21S and 8-1 would downgrade approximately 1,379 acres of suitable habitat by commercial thinning to dispersal habitat. Units 5-8S, 31-1, and 33-2C would degrade approximately 292 acres of dispersal habitat through commercial thinning and sanitation/root rot treatments. Commercial thinning would reduce future recruitment of snags and resulting down wood created from snags by removing suppressed or defective trees, and would decrease the future quality of the habitat to provide optimal nesting structure, and optimal prey abundance.

The USFWS Section 7 Watershed (Cow-Upper) encompasses the West Fork Cow, Middle Cow and Upper Cow 5th field watersheds. The removal and downgrading of suitable habitat under Alternative 3 would likely impair the ability of at least some of the owls (see Table 3.7) in the planning area, to breed, feed, and shelter in the Cow-Upper watershed. The removal and downgrading of suitable habitat under Alternative 2 would also likely reduce the ability of owls nesting in bordering portions of adjacent watersheds by reducing available habitat supporting roosting and foraging within owl home ranges, and may reduce future alternate nest site selection. The ultimate fate of individual owls in the Planning Area (see Table 3.7) or owls in adjacent watersheds utilizing habitat in the Planning Area, as a result of the proposed habitat modification, is unknown due to the variability in individual owl response to habitat modification, the unknown actual home range and habitat use of individual owl sites, stochastic effects and complications that other influences (e.g. disease and barred owls) might have. Alternative 3 was designed under the guidelines of the NFP and RMP, and Project Design Features (Section 2.3.9.1) would minimize impacts to the spotted owl. Resident spotted owls using the treated stands would be anticipated to expand home range size to compensate for habitat loss and degradation (Meiman 2003, pp. 1254-1262).

The harvest of 1,338 acres of late-successional suitable owl habitat through RH, GS, OR, and SW treatments would result in a loss of nesting habitat available for alternate nesting sites, reduced prey availability for adults and young, and loss of habitat available for dispersing owls. However, these stands would provide woodrat habitat for 5-10 years (Carey et. al. 1999) for foraging owls along the edges of regeneration harvested units and would develop into dispersal habitat in approximately 30 years.

The Fish and Wildlife Service analyzed incidental take of northern spotted owls by considering the removal, downgrading, or degradation of all suitable and dispersal habitat acres at the Cow Upper Section 7 Watershed level in the BO (Log # 1-15-06-F-0162).

Harvesting late-successional stands would reduce the viability of owl sites on matrix lands as anticipated in the NFP (USDA/USDI. 1994a 3&4-241). The effects of disturbance, loss and degradation of habitat due to fire, harvesting, road construction, manifested in the spotted owl population decline rate, are not greater than was analyzed in the RMP (USDA/USDI 1994, p. 4-78) and NFP (USDA/USDI.1994a, pp. 3&4 -211-234).

Habitat affected by construction of 0.5 miles of permanent roads, approximately 0.5 acres, cannot be expected to return to a functional habitat condition. Habitat affected by construction of five and one-half miles of temporary roads, approximately five acres, which would be decommissioned after use, can be expected to return to a functional dispersal condition of 40 per cent canopy closure and trees averaging 11inches dbh or greater in approximately 50-60 years.

The 988 acres of slash, pile, pile burn, and underburning of hazardous fuel treatments are expected to degrade in the short-term (3-5 years) suitable and dispersal spotted owl habitat. Habitat degradation would primarily occur through removal of 1”-7” material, which are used for denning and nesting by a primary northern spotted owl prey species, the bushy-tailed woodrat, resulting in an expected decrease in available prey. Although there would be short-term impacts, it is expected they would be outweighed by the long-term benefits for northern spotted owls due to the reduction of risk of stand-replacement wildfire as a result of these fuels treatments.

Alternative 3 would remove 1,338 acres of suitable habitat and downgrade an additional 1,379 acres of habitat through timber harvest. There would also be 292 acres degraded to dispersal habitat. Additionally, the project would degrade 988 acres of suitable and dispersal habitat through fuels treatments, and remove 5 acres of habitat through placement of roads. This level of impact to northern spotted owl habitat in the NGFMA Planning Area was anticipated in the NFP and RMP. The Medford ROD/RMP assumed an average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP, p. 9-11) and the effects to suitable habitat was analyzed on pages 4-73 and 4-74 of the RMP/EIS, based on the assumed level of harvest. The actual amount offered for sale on the Medford District from 1995 to 2004 fell far below this amount, as it was less than 500 acres of regeneration harvest and overstory removal per year. Given this fact, the amount of harvest under Alternative 3 would maintain harvest levels within the harvest assumptions of the RMP, and hence within the level of impact to northern spotted owl habitat in the NGFMA Planning Area as anticipated in the NFP and RMP. The reduction of suitable habitat and degradation to owl sites within matrix land is within the assessment of the NFP and the FY 06-08 Biological Assessment, and a shift to increasing numbers of owl sites in maturing large reserves is expected to contribute to the recovery goals and conservation needs of spotted owls by providing multiple clusters of breeding spotted owls (RORSISBLM FY 06-08 BA, pp. 29-30).

Cumulative Effects

Cumulative effects in the Planning Area result from the incremental impact of Alternative 3, added to other past, present, and reasonably foreseeable actions regardless of land ownership. The majority of remaining older forest in this watershed is on public lands managed by BLM. Past activities have resulted in habitat loss and have changed the distribution and abundance of many wildlife species in the Planning Area. Species associated with younger forested conditions have benefited from these changes. Habitat modification and removal with fewer protection measures would continue on private or county lands, which negatively affect late-successional dependent wildlife species on these lands. The RMP/EIS assumed that in the future nonfederal lands would have no suitable habitat (RMP/EIS, 4-73) due to 50-80 year rotations on private lands, but are expected to provide some dispersal habitat.

Extensive harvesting on BLM occurred in the Planning Area prior to the 1990 listing of the spotted owl as a threatened species, and the implementation of the NFP in 1994. The Middle Cow Creek Watershed Analysis (USDI 1999, p. 36) notes that the late successional stands in this watershed are highly fragmented and frequently isolated from other late successional stands because of the checkerboard pattern of federal land ownership and past logging practices. Harvesting on private lands continues to be extensive. Most private land has been intensively harvested, much of it in the last few decades (satellite change detection data 1974-2002). Other past events, such as quarry development, road building, rock slides, and fire (Table 3-8) have also contributed to a total of at least 23 % (satellite imagery change detection data) of the Fortune, Windy, and Quines 6th field sub-watersheds being converted to presently unsuitable spotted owl habitat.

The RMP/EIS assumed that in the future nonfederal lands would have no suitable habitat (RMP/EIS, 4-73) due to 50-80 year rotations on private lands, but are expected to provide some dispersal habitat. The cumulative effect of harvesting from private lands and Alternative 3 is less than what was anticipated in the RMP/ROD. BLM administered lands assumed average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP. p, 9-11). The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres. The cumulative removal and downgrading of 2,772 acres of suitable habitat in Westside combined with other foreseeable projects in this watershed through Fiscal Year 2008 (estimated 2,597 acres; e.g., Middle Cow Creek LSR and Boney Skull), is approximately 12% (5,369 of 43,242 acres) of the current suitable habitat in this Section 7 watershed. In addition to the cumulative effects of activities reducing available habitat supporting the local owl population within the Cow-Upper Section 7 watershed, habitat within the Planning Area may also be utilized by owls within adjacent 5th field watersheds. The Can-Can Environmental Assessment (USDI 2006, EA #OR 105-05-06 p. 34) analyzed the cumulative effects of habitat loss on the spotted owl, and stated that the stability of the population within the Klamath Mountain physiographic province was within the predictions of the Northwest Forest Plan. The effects of Alternative 2, combined with the foreseeable effects of the Roseburg District BLM's Screen Pass Timber Sale would further reduce suitable habitat available for owls, and contribute to the reduced viability of matrix land owl sites utilizing both project areas, through reduction of available habitat utilized for breeding, nesting, feeding, sheltering, or dispersing. The ultimate fate of individual owls in the Planning Area (see Table 3.7) and owls in adjacent 5th field watershed utilizing habitat in the Planning Area, as a result of the combined effects of both projects is unknown due to the variability in individual owl response to habitat modification, the unknown actual home range and habitat use of individual owl sites, stochastic effects and complications that other influences (e.g. disease and barred owls) might have. Nonetheless, the combined consequences of these projects' harvest of late-successional stands, including the reduced viability of owl sites on matrix lands, were anticipated in the NFP (USDA/USDI. 1994a 3&4-241). Under the NFP, only matrix based spotted owl sites identified as of January 1994 received 100 acre residual habitat areas, which were not considered adequate to maintain reproductive owl pairs (USDA/USDI 1994 p.3&4-241) and provide for the long-term needs of owl pairs. The function of matrix lands is to serve as connectivity between late-successional reserves (USDA/USDI. 1994 vol 2, p. B-43). Remaining nesting habitat on private land is not expected in the future to be suitable habitat, given a stand age rotation of 60 years (RMP/EIS, pp.4-5).

The Biological Assessment (RORSISBLM FY 06-08 BA p. 42) stated that no more than 13 percent of the suitable habitat would be removed from any Section 7 Watershed and that reduction was anticipated in the NFP. Cumulative effects on the spotted owl sites in or adjacent to the Planning Area affected by the Proposed Action, when added to any cumulative effects of the Proposed Action and the Roseburg District BLM's Screen Pass Timber Sale on are not expected to change the stable population trend in the Klamath Province as noted in 3.3.3.1 above.

3.3.2 Northern Spotted Owl Critical Habitat

3.3.2.1 Affected Environment

All northern spotted owl critical habitat (CHU OR-32) in the Planning Area occurs in the southeastern sector (see Environmental Elements Map).

Critical habitat was designated for the northern spotted owl in February, 1992, and, as defined in the ESA, is "the specific areas within the geographic area occupied by a species…on which are found those physical or biological features essential to the conservation of the species," (USDI 1992). These features are referred to as the primary constituent elements which support the life requisites of nesting, roosting, foraging, and dispersal. As the FWS noted in its biological opinion on the NFP, for a wide-ranging species such as the spotted owl, each CHU has both a local role and a rangewide role (USDI 1994, p.20). Impacts from proposed harvest therefore are evaluated based upon removal, downgrading, and degradation of suitable (nesting, roosting, foraging) habitat and dispersal habitat, and are evaluated at both the local level and the provincial level.

The Planning Area includes CHU OR-32. As a result of past harvest in this CHU, an estimated 35,165 acres of this 68,873 acre CHU, or approximately 51%, are currently suitable for nesting, roosting, and foraging habitat (USDA/USDI 2006, p.50). Critical Habitat Unit OR-32 coincides with the Rogue-Umpqua Area of Concern (also referred to as the Galesville Area of Concern), which provides an essential link in connecting the Western Cascades Province with southern portion of the Coast Ranges and the northern end of the Klamath Mountains Province (USDA/USDI 2006 BA, App. B-18). Approximately 37% of this CHU is within the Cow Creek Late-Successional Reserve (USDA/USDI 2006 BA, App. B-18). The land ownership patterns elevate the importance of maintaining owl nesting habitat to link the Western Cascades, Coast Ranges and the Klamath Provinces (USDA/USDI 2006 BA, App. B-18). While no target amounts of nesting, roosting and foraging habitat were identified for critical habitat, the current baseline for all CHUs in SW Oregon Administrative Units 442,177 acres (USDA/USDI 2006 BA, Table 6, p.50).

3.3.2.2 Effects of Alternative 1 (No Action) on Critical Habitat

Direct and Indirect Effects

Under the No Action Alternative, no harvest would occur in northern spotted owl critical habitat. Growth of late-successional and old-growth forest habitat would continue. If harvesting is deferred, older stand development would additionally contribute greater amounts of standing and downed wood. However, stands would likely be reviewed under future actions for harvesting and would not likely support additional productive owl sites. With no thinning, the trajectory of some stands to grow into better suitable habitat would continue at a slower rate than if stands were thinned. The lack of fuels treatments would increase the risk of stand replacement fire within the Critical Habitat Unit (see section 3.2.2.). Such a fire would reduce the amount of suitable and dispersal owl habitat, depending on the extent and intensity of the fire.

Temporary and permanent right of way construction would continue on BLM and private lands to allow private harvesting, resulting in removal of suitable and dispersal habitat. The survival of spotted owl sites within the Klamath Demographic Study Area would remain stable, and contribute to a stable population within the Klamath Province (USDA/USDI 2004b).

3.3.2.3 Effects of Alternative 2 (Proposed Action) on Critical Habitat

Direct and Indirect Effects

The projected amount of suitable (nesting, roosting, foraging) habitat within CHU OR-32 which would be removed as a result of the proposed action is 238 acres. These units include # 3-5, 3-5A, 3-19, 4-4, 4-20, 4-20S, 4-24, 4-33, 5-7S, 31-3, 33-2A, and 33-2B. The projected amount of suitable habitat which would be downgraded to a dispersal condition (40%-60% canopy closure) comprises 381 acres, and includes Units #3-8, 3-10, 3-11, 4-8, 4-3S, 4-19S, 4-20SA, 4-21S, 5-9S, 5-10S, 5-21S, and 31-8. These units were field-reviewed and classified as currently suitable habitat which occurs within Critical Habitat Unit OR-32. Units #31-1, 33-2C, and 5-8S, comprising approximately 292 acres, would degrade existing dispersal habitat through commercial thinning and sanitation/root rot treatments. The 2006 baseline nesting, roosting, foraging (NRF) acres within CHU OR-32 are reported as 35,165 acres (RORSISBLM FY 06-08 BA, p. BA- 50). The Proposed Action would result in removal or downgrade of a total of 619 acres, approximately 2% of the currently available suitable habitat with this CHU.

The 265 acres of slash, pile, pile burn, and underburn critical habitat fuels treatments are expected to degrade in the short-term (3-5 years) suitable spotted owl critical habitat through reduction of multi-storied stand structure and removal of 1”-7” fine fuels which are used for denning and nesting by two primary prey species, the dusky footed and bushy-tailed woodrat (Forsman, 2004). It is expected there would be a beneficial effect to northern spotted owl critical habitat due to the reduction of risk of stand-replacement wildfire as a result of these fuels treatments.

Critical Habitat affected by construction of two and one-quarter miles of temporary roads, approximately two acres, which would be decommissioned after use, can be expected to return to a functional dispersal condition of 40% canopy closure and trees averaging 11”dbh or greater in approximately 50-60 years.

Units 31-1, 5-8S, and 33-2C lie within Critical Habitat Unit OR-32. These units, comprising 292 acres, lack suitable habitat structure for nesting, roosting, or foraging. Habitat would be degraded, but continue to function as dispersal quality habitat. The canopy reduction would last for 10-20 years. The removal of suppressed or defective trees would degrade the effectiveness of the habitat to develop into suitable owl habitat.

In summary, under Alternative 2, the project proposes to remove 238 acres of suitable habitat, downgrades 381 acres of suitable habitat, and degrades 292 acres of dispersal habitat through timber harvest, and degrades 265 acres of suitable and dispersal habitat through fuels treatments. According to the 2006 environmental baseline, the total acreage of all CHUs in the Klamath Province is 913,954, of which 442,177, or approximately 48% are considered currently suitable habitat (USDA/USDI 2006, Table 6, p.50). The removal and downgrading of 619 acres under this alternative affects 2% of the suitable habitat within the CHU, and .1% of the currently suitable habitat within CHUs in the Klamath Province. Because CHU function is assessed both at the local CHU scale and also at the provincial level, this very small amount of impact is not expected to substantially alter its function.

Cumulative Effects
Cumulative effects in CHU OR-32 result from the incremental impact of Alternative 2, added to other past, present, and reasonably foreseeable actions. The majority of remaining older forest in this CHU is on public lands managed by BLM. Past activities have resulted in habitat loss and have changed the distribution and abundance of many wildlife species in the CHU. Species associated with younger forested conditions have benefited from these changes. Habitat modification and removal with fewer protection measures would continue on private or county lands, which negatively affect suitable and dispersal CHU habitat for northern spotted owls. Due to 40-60 year rotations on private lands, expected to continue in the Planning Area, private lands would not provide suitable spotted owl habitat, but are expected to provide some dispersal habitat.

Extensive harvesting on BLM occurred in the CHU prior to the 1990 listing of the spotted owl as a threatened species, and the implementation of the NFP in 1994. The Middle Cow Creek Watershed Analysis (1999, p.36) notes that the late-successional stands in this watershed are highly fragmented and frequently isolated from other late successional stands because of the checkerboard pattern of federal land ownership and past logging practices. Harvesting on private lands continues to be extensive. Most private land has been intensively harvested, much of it in the last few decades (satellite change detection data 1974-2002). Other past events, such as quarry development, road building, rock slides, and fire (Table 3-8) have also contributed to a total of at least 23 % (satellite imagery change detection data) of the Fortune, Windy, and Quines 6^{th} field sub-watersheds being converted to presently unsuitable spotted owl habitat.

The construction of 0.5 miles of permanent roads is expected to be an irretrievable commitment of resources. The five and one-half miles of temporary road which would be decommissioned after use can be expected to return to a functional dispersal condition of 40% canopy closure and trees averaging 11 inch ”dbh or greater in approximately 50-60 years.

The 2006 baseline nesting, roosting, foraging (NRF) acres within CHU OR-32 are reported as 35,165 acres (RORSISBLM FY 06-08, p. BA-50). The proposed action would result in removal or downgrade of a total of 619 acres, approximately 2% of the currently available suitable habitat with this CHU. The cumulative removal and downgrading of 619 acres of suitable habitat, combined with other foreseeable projects in this CHU, including an estimated 400 acres in the Middle Cow LSR Project and Boney Skull, is approximately 3% (1,019 of 35,165 acres) of current CHU suitable habitat. The BA (RORSISBLM FY 06-08) states that it has anticipated the removal or downgrade of up to 4,442 acres of suitable habitat from all CHUs over the next three years. The Westside Project is included in this prediction.

3.3.2.4 Effects of Alternative 3 on Critical Habitat

Direct and Indirect Effects

The projected amount of suitable (nesting, roosting, foraging) habitat within CHU OR-32 which would be removed as a result of implementing Alternative 3 is 198 acres. These units include Units # 3-5, 3-5A, 3-19, 4-4, 4-20S, 5-7S, 31-3, 33-2A, and 33-2B. The projected amount of suitable habitat which would be downgraded to a dispersal condition (40%-60% canopy closure) comprises 367 acres, and includes Units #3-8, 3-10, 3-11, 4-8, 4-21S, 4-3S, 4-19S, 5-10S, 5-21S, 31-8, and 4-20SA. These units were field-reviewed and classified as currently suitable habitat which occurs within Critical Habitat Unit OR-32. Units #31-1, 33-2C, and 5-8S, comprising approximately 292 acres, would degrade existing dispersal habitat through commercial thinning treatments. This alternative would result in removal or downgrade of a total of 565 acres, approximately 2% of the currently available suitable habitat with this CHU. At the local scale, since this amount is relatively small in proportion to the overall CHU, it is expected this action would not appreciably diminish the function of this unit.

The 265 acres of slash, pile, pile burn, and underburn critical habitat fuels treatments are expected to degrade in the short-term (3-5 years) suitable and dispersal spotted owl critical habitat through removal of 1”-7” fine fuels which are used for denning and nesting by a primary prey species, the bushy-tailed woodrat. It is expected there would be a beneficial effect to northern spotted owl critical habitat due to the reduction of risk of stand-replacement wildfire as a result of these fuels treatments.

Critical Habitat affected by construction of one and eight-tenths miles of temporary roads, approximately one and three-quarters acres, which would be decommissioned after use, can be expected to return to a functional dispersal condition of 40 per cent canopy closure and trees averaging 11inch dbh or greater in approximately 50-60 years.

In summary, under Alternative 3, the project proposes to remove 198 acres of suitable habitat, downgrades 367 acres of suitable habitat, degrades 292 acres of dispersal habitat through timber harvest, and degrades 265 acres of suitable and dispersal habitat through fuels treatments. According to the 2006 environmental baseline, the total acreage of all CHUs in the Klamath Province is 913,954, of which 442,177, or approximately 48% are considered currently suitable habitat (USDA/USDI 2006, Table 6, p.50). The removal and downgrading of 565 acres under this alternative affects 2% of the suitable habitat within the CHU, and .1% of the currently suitable habitat within CHUs in the Klamath Province. Because CHU function is assessed both at the local CHU scale and also at the provincial level, this very small amount of impact is not expected to substantially alter its function.

Cumulative Effects
Cumulative effects in CHU OR-32 result from the incremental impact of Alternative 3, added to other past, present, and reasonably foreseeable actions. The majority of remaining older forest in this CHU is on public lands managed by BLM. Past activities have resulted in habitat loss and have changed the distribution and abundance of many wildlife species in the CHU. Species associated with younger forested conditions have benefited from these changes. Habitat modification and removal with fewer protection measures would continue on private or county lands, which negatively affect suitable and dispersal CHU habitat for northern spotted owls. Due to 40-60 year rotations on private lands, expected to continue in the Planning Area, private lands would not provide suitable spotted owl habitat, but are expected to provide some dispersal habitat.

Extensive harvesting on BLM occurred in the CHU prior to the 1990 listing of the spotted owl as a threatened species, and the implementation of the NFP in 1994. The Middle Cow Creek Watershed Analysis (1999, p.36) notes that the late-successional stands in this watershed are highly fragmented and frequently isolated from other late successional stands because of the checkerboard pattern of federal land ownership and past logging practices. Harvesting on private lands continues to be extensive. Most private land has been intensively harvested, much of it in the last few decades (satellite change detection data 1974-2002). Other past events, such as quarry development, road building, rock slides, and fire (Table 3-8) have also contributed to a total of at least 23 % (satellite imagery change detection data) of the Fortune, Windy, and Quines 6th field sub-watersheds being converted to presently unsuitable spotted owl habitat.

The construction of 0.5 miles of permanent roads is expected to be an irretrievable commitment of resources. The five and one-half miles of temporary road which would be decommissioned after use can be expected to return to a functional dispersal condition of 40% canopy closure and trees averaging 11”dbh or greater in approximately 50-60 years.

The 2006 baseline nesting, roosting, foraging (NRF) acres within CHU OR-32 are reported as 35,165 acres (RORSISBLM FY 06-08, p.BA-50). Alternative 3 would result in removal or downgrade of a total of 565 acres, approximately 2% of the currently available suitable habitat with this CHU. The cumulative removal and downgrading of 565 acres of suitable habitat, combined with other foreseeable projects in this CHU, including an estimated 400 acres in the Middle Cow Creek LSR Project and Boney Skull is approximately 3% (965 of 35,165 acres) of current CHU suitable habitat. The BA (RORSISBLM FY 06-08) states that it has anticipated the removal or downgrade of up to 4, 442 acres of suitable habitat from all CHUs over the next three years. The Westside Project is included in this prediction.

3.3.3 Fisher (Bureau Sensitive, Federal Candidate)

3.3.3.1 Affected Environment

Fishers are secretive small mammals associated with closed canopy conditions in late-successional forests throughout its range in the western United States, often associated with riparian areas (Aubry and Houston 1992, Dark 1997). Jones and Garton (1994) noted that fisher do not use non-forested lands (<40% canopy cover). The fisher was analyzed in the NFP and failed to pass the screens indicating likelihood of persistence (species viability screens) due to its dependence on interior forest habitat and large, down woody debris (Appendix J-2, USDA/USDI 1994).

Approximately 22,000 acres of the 45,642 acres of BLM administered lands, within the 110,000 acre Middle Cow Creek watershed are considered to be late-successional forest (USDI 1999). BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA/USDI 1994b).

The USFWS listed the west coast distinct population segment of the fisher under ESA in 2004, as warranted but precluded due to other USFWS priorities (Federal Register April 8, 2004). The document further discloses that extant fisher populations in Oregon are restricted to two disjunct and genetically isolated populations in the southwestern portion of the State: one in the Siskiyou Mountains of the southwestern region and a reintroduced population in the southern Cascade Range. The fishers in the Siskiyou Mountains near the California border are probably an extension of the northern California population, and are believed to represent the northern extent of indigenous fisher populations in the Pacific states. Causes of historical population declines in the pacific states include loss of habitat from logging, overtrapping, predator control, and urban and agricultural development. High intensity fires from fuels buildup could also have contributed to the loss of habitat. Habitat loss may have extirpated breeding fishers from the Planning Area. Dispersal of fishers is also possibly restricted by large rivers and wide highways. There are no known sightings in the Glendale Resource Area. The nearest known sightings, from three incidental visual observations (Kerwin, pers.comm.), are approximately 6 km southwest. Powell and Zielinski (1994) generalized an average home range for fishers as 40 and 15 km^2 for males and females respectively. Habitat in the adjacent LSR, which contains solid block ownership and extensive stands of older interior forest, could be used by fisher, and they could occupy or be dispersing through the Planning Area.

Approximately seventy remote camera surveys were conducted to protocol (Zielinski and Kucera 1995) in 2002-2005 in the Glendale Resource Area, with no fisher detections. Field surveys and incidental road observations from BLM personnel have also failed to detect this species in the Middle Cow Creek watershed or in any of the other 5th field watersheds within the Glendale Resource Area.

Based on nearby surveys and the fragmented landscape, the likelihood of fishers using the Planning Area is low

3.3.3.2 Environmental Effects of Alternative 1 (No Action) on fishers

Direct and Indirect Effects

The Middle Cow Creek watershed would continue to provide habitat poorly suited for fishers due to landscape fragmentation as a result of checkerboard ownership, continued harvesting and stand age rotation of 60 years on private lands (RMP/EIS, p.4-5), past federal harvest, low quantity of large blocks of late-successional forest on BLM, low densities of large snags and down wood on BLM land harvested prior to the NFP, and high road densities.

The greatest risk of no action is the higher wildfire-related fire hazard which would occur, threatening loss of large live remnant conifers important to fisher natal and maternal denning sites

3.3.3.3 Environmental Effects of Alternative 2 (Proposed Action) on Fishers

Direct and Indirect Effects
The proposed action is unlikely to impact fishers because they are not suspected to occur in the area.

Alternative 2 would remove or downgrade approximately 3,082 acres of late-successional forest from OR, RH, GS, shelterwood, and CT units, reducing closed canopy conditions. Large snags and down wood retained in OR/RH/SC/GS areas would be less suitable for denning until covered with regrowth (30-40 years). Approximately 292 acres of dispersal habitat in CT units would be degraded and retain approximately 40% canopy, providing reduced protection and foraging until the understory responds to increased light levels.

Fuels treatments would have short-term negative effects to fisher prey species by reducing prey forage due to removal of understory plants and loss of below-ground fungi. Stands that retain 40% canopy closure would likely result in lower squirrel abundance because of reduced truffle production and arboreal travel ways (Colgan et al. 1999, Carey 2000b). Additionally, these treatments would reduce abundance of other small mammal prey species (squirrels, rabbits, mice, voles, etc.) because of reduced understory and overstory vegetation. These effects are relatively short-term; understories typically revegetate within 5 years and overstory canopy often regains 60% canopy closure within 10-20 years. These short-term effects to fisher prey species would also be minimal because untreated areas would continue to provide forage habitat.

Impacts associated with timber sale noise disturbance are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987, Powell 1993). Alternative 2 proposes constructing only 0.5 miles of new road. Disturbance from timber sale operations would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range (Powell and Zielinski 1994 generalized an average home range for fishers as 40 and 15 km^2 for males and females respectively).

Alternative 2 is not expected to contribute to the need to federally list the fisher as threatened or endangered. While some habitat would be removed or degraded, suitable fisher denning, foraging, and dispersal habitat would remain in the Planning Area. Since fishers are wide-ranging, they can move to minimize disturbance and utilize optimal habitat. Seasonal restrictions for wildlife, soil, and other resources would also benefit fishers by restricting project activities until young are approximately six weeks old.

Habitat features, such as large snags and coarse wood would be maintained throughout the Planning Area, which would provide future habitat for denning and nesting. Additionally, late-successional habitat would be maintained throughout the watershed in riparian reserves, 100-acre Known Spotted Owl Activity Centers, connectivity blocks, and 15% late-successional forest retention (RMP, pp.38-40). These reserve areas would continue to provide suitable habitat for fisher and would help maintain future dispersal opportunities throughout the Planning Area and the watershed.

Cumulative Effects
Due to the small size and isolation of late-successional forest units from previous harvesting on BLM matrix and private lands within the Middle Cow Creek watershed, it is possible that it may no longer be suitable for resident fishers. The largest late-successional blocks are expected to continue be restricted to LSRs. With the cumulative effects of private harvesting, low BLM ownership and few large patches of BLM late-successional habitat at low elevations, combined with the fisher's natural rareness and slow re-colonization rates of restored habitats, the species is not expected to be well distributed throughout its range (USDA/USDI 1994a, pp. 53, 470). This project would not change the assessment predicted in the NFP.

Impacts to potential fisher habitat through loss of late-successional forest and modification to mid/late seral habitat are minor, due to project design and mitigations (USDA/USDI 1994a, p. 470). Some large snags and down wood den habitat may be lost, or the suitability of potential den sites may be reduced due to harvesting or fuels treatments. Harvesting smaller group selection units, deferring larger late-successional blocks of habitat, and increasing large retention trees from 6-8 to 7-10 trees per acre, would minimize the impact to this species (USDA/USDI 1994a, p. 470).

The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres. While this figure represents suitable owl nesting, roosting, or foraging habitat, its later-successional, closed-canopy conditions also act as an indicator of the relative amount of mature forest habitat available for fisher use. The cumulative removal and downgrading of 3,087 acres of suitable habitat combined with other foreseeable projects in this watershed is approximately 13% of the baseline. Remaining mature forested habitat on private land is not expected in the future to be suitable for fisher use, given a stand age rotation of 40-60 years.

The construction of 0.5 miles of permanent roads is expected to be an irretrievable commitment of resources. The five and one-half miles of temporary road which would be decommissioned after use can be expected to return to a functional dispersal condition of 40 per cent canopy closure and trees averaging 11"dbh or greater in approximately 50-60 years.

To summarize, cumulative effects under Alternative 2 are not expected to contribute to the need to federally list the fisher as threatened or endangered. The Proposed Action is unlikely to impact fishers because they are not suspected to occur in the area. While some habitat would be removed or degraded, suitable fisher denning, foraging, and dispersal habitat would remain in the Planning Area. Since fishers are wide-ranging, they can move to minimize disturbance and utilize optimal habitat. Seasonal restrictions for wildlife, soil, and other resources would also benefit fishers by restricting project activities until young are approximately six weeks old. Habitat features, such as large snags and coarse wood would be maintained throughout the Planning Area, which would provide future habitat for denning and nesting. Additionally, late-successional habitat would be maintained throughout the watershed in riparian reserves, 100-acre Known Spotted Owl Activity Centers, connectivity blocks, and 15% late-successional forest retention (RMP, pp.38-40). These reserve areas would continue to provide suitable habitat for fisher and would help maintain future dispersal opportunities throughout the Planning Area and the watershed

3.3.3.4 Environmental Effects of Alternative 3 on Fishers

Direct and Indirect Effects

Alternative 3 is unlikely to impact fishers because they are not suspected to occur in the area.

Alternative 3 proposes to remove or downgrade approximately 2,717 acres of late-successional forest from OR, RH,GS, shelterwood, and CT units. Large snags and down wood retained in OR/RH/SC/GS areas would be less suitable for denning until covered with regrowth (30-40 years). Approximately 292 acres of dispersal habitat in CT units would be degraded and retain approximately 40% canopy, providing reduced protection and foraging until the understory responds to increased light levels.

Fuels treatments would have short-term negative effects to fisher prey species by reducing prey forage due to removal of understory plants and loss of below-ground fungi. Stands that retain 40% canopy closure would likely result in lower squirrel abundance because of reduced truffle production and arboreal travel ways (Colgan et al. 1999, Carey 2000b). Additionally, these treatments would reduce abundance of other small mammal prey species (squirrels, rabbits, mice, voles, etc.) because of reduced understory and overstory vegetation. These effects are relatively short-term; understories typically revegetate within 5 years and overstory canopy often regains 60% canopy closure within 10-20 years. These short-term effects to fisher prey species would also be minimal because untreated areas would continue to provide forage habitat.

Impacts associated with timber sale noise disturbance are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987, Powell 1993). Alternative 3 proposes constructing only 0.5 miles of new road. Disturbance from timber sale operations would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range (Powell and Zielinski 1994 generalized an average home range for fishers as 40 and 15 km^2 for males and females respectively). The construction of 0.5 miles of permanent roads is expected to be an irretrievable commitment of resources. The five and one-half miles of temporary road which would be decommissioned after use can be expected to return to a functional dispersal condition of 40 per cent canopy closure and trees averaging 11”dbh or greater in approximately 50-60 years.

In summary, Alternative 3 is not expected to contribute to the need to federally list the fisher as threatened or endangered. While some habitat would be removed or degraded, suitable fisher denning, foraging, and dispersal habitat would remain in the Planning Area. Since fishers are wide-ranging, they can move to minimize disturbance and utilize optimal habitat. Seasonal restrictions for wildlife, soil, and other resources would also benefit fishers by restricting project activities until young are approximately six weeks old. Habitat features, such as large snags and coarse wood would be maintained throughout the Planning Area, which would provide future habitat for denning and nesting. Additionally, late-successional habitat would be maintained throughout the watershed in riparian reserves, 100-acre Known Spotted Owl Activity Centers, connectivity blocks, and 15% late-successional forest retention (RMP, pp.38-40). These reserve areas would continue to provide suitable habitat for fisher and would help maintain future dispersal opportunities throughout the Planning Area and the watershed.

Cumulative effects

Due to the small size and isolation of late-successional forest units from previous harvesting on BLM matrix and private lands within the Middle Cow Creek watershed, it is possible that it may no longer be suitable for resident fishers. The largest late-successional blocks are expected to continue to be restricted to LSRs. With the cumulative effects of private harvesting, low BLM ownership and few large patches of BLM late-successional habitat at low elevations, combined with the fisher's natural rareness and slow re-colonization rates of restored habitats, the species is not expected to be well distributed throughout its range (USDA/USDI 1994a, pp. 53, 470). Alternative 3 would not change the assessment predicted in the NFP.

Impacts to potential fisher habitat through loss of late-successional forest and modification to mid/late seral habitat are minor, due to project design and mitigations (USDA/USDI 1994a, p. 470). Some large snags and down wood den habitat may be lost, or the suitability of potential den sites may be reduced due to harvesting or fuels treatments. Harvesting smaller group selection units, deferring larger late-successional blocks of habitat, and increasing large retention trees from 6-8 to 7-10 trees per acre, would minimize the impact to this species (USDA/USDI 1994a, p. 470).

The USFWS Section 7 Cow-Upper watershed baseline suitable habitat is 43,242 acres. While this figure represents suitable owl nesting, roosting, or foraging habitat, its later-successional, closed-canopy conditions also act as an indicator of the relative amount of mature forest habitat available for fisher use. The cumulative removal and downgrading of 2,772 acres of suitable habitat combined with other foreseeable projects in this watershed is approximately 12% of the baseline. Remaining mature forested habitat on private land is not expected in the future to be suitable for fisher use, given a stand age rotation of 40-60 years.

The construction of 0.5 miles of permanent roads is expected to be an irretrievable commitment of resources. The five and one-half miles of temporary road which would be decommissioned after use can be expected to return to a functional dispersal condition of

40 per cent canopy closure and trees averaging 11”dbh or greater in approximately 50-60 years.

To summarize, cumulative effects under Alternative 3 are not expected to contribute to the need to federally list the fisher as threatened or endangered. This alternative is unlikely to impact fishers because they are not suspected to occur in the area. While some habitat would be removed or degraded, suitable fisher denning, foraging, and dispersal habitat would remain in the Planning Area. Since fishers are wide-ranging, they can move to minimize disturbance and utilize optimal habitat. Seasonal restrictions for wildlife, soil, and other resources would also benefit fishers by restricting project activities until young are approximately six weeks old. Habitat features, such as large snags and coarse wood would be maintained throughout the Planning Area, which would provide future habitat for denning and nesting. Additionally, late-successional habitat would be maintained throughout the watershed in riparian reserves, 100-acre Known Spotted Owl Activity Centers, connectivity blocks, and 15% late-successional forest retention (RMP, pp.38-40). These reserve areas would continue to provide suitable habitat for fisher and would help maintain future dispersal opportunities throughout the Planning Area and the watershed.

3.4 Soils, Water Quality, and Fisheries

3.4.1 Soils

3.4.1.1 Affected Environment

This watershed is located within the Klamath Mountain Province. The Klamath Mountains were formed from Mesozoic-Jurassic geologic formations which are folded and faulted, and intruded by the collision of the North American and Farallon Plates. Extensive natural erosion has created steep canyons with slopes averaging 50-70 percent. National Resource Conservation Service (NRCS) Douglas County Soils Survey Manual identifies the steepness of the slope as a “Major management limitation” for many soil types and complexes with slopes at or above 30 percent. The Planning Area is mostly the Galice Formation, which is composed of metavolcanic and metasedimentary rock types, intruded by the White Rock Pluton. Soils derived from metasedimentary rock tend to be deeper and have more nutrients, whereas the metavolcanic and granitic soils tend to be shallower, with fewer nutrients and a lower water holding capacity. Soils of ultramafic metavolcanic and granitic origin are generally poorly developed and prone to erosion if disturbed. Metasedimentary and other metavolcanic soils in this Planning Area tend to be more developed, have a higher nutrient availability, and are generally relatively stable when dry. Productivity on most sites increases toward the lower 1/3 of the slope due to increased depth of the soils. On many of these soils, especially the granitics, schists, serpentine, peridotite, and some sandstones, site productivity is regulated by nutrient inputs obtained from the organic layer.

The NRCS Douglas County Soils Survey Manual revealed 12 different soil types or complexes specific to this Planning Area. These consist of several types of gravelly loams, including Acker, Josephine, Durmont, and Pollard, which are generally found on lower slopes and are relatively resistant to compaction when dry. These soils are typically moderately deep with depths ranging from 40 to 60 inches to bedrock. They are well drained with moderately slow permeability, and have a relatively high available water capacity. All of these soils have “hazard of compaction and erosion” identified as “major management limitations” in the NRCS Douglas County Soils Survey Manual. For all expect the Josephine Gravelly Loam, “steepness of slope” is also identified as a “major management limitation”. Additionally, soil complexes found within the Planning Area include Acker-Norling, Atring-Vermisa, Josephine-Speaker, Beekman-Vermisa, and Kanid-Atring. These complexes typically occur on slopes between 60-90%, and as a result are prone to erosion where disturbed. All of these complexes have “hazard of erosion” and “steepness of slope” identified as “major management limitations” in the NRCS Douglas County Soils Survey Manual. Areas of shallow and rocky soils are also common within these complexes. Mass wasting and debris flows are uncommon within this planning area. However, isolated slumps periodically occur on the wetter north and east slopes in these soils, and more regularly along the numerous geologic contact zones, fault lines, and in association midslope roads located on steep slopes. The Umpqua Basin Watershed Council Middle Cow Creek Watershed Assessment and Action Plan (Kincaid, 2002) states that “(r)oads across steep slopes have more soil accumulating in the road ditches. The more soil (that accumulates) in the ditch, the greater chance of the ditch blocking, causing standing water and undermining the road surface integrity. In a worst-case scenario, this could cause the road to collapse.” Roads across steep slopes are common throughout this planning area. The Umpqua Watershed Council found that within 200 feet of streams, nearly 70 miles of road were constructed across steep slopes within the Middle Cow HUC 5 watershed.

<u>Productivity</u>
Soil productivity, in a forested setting, is primarily the soil's capacity to support plant growth as reflected by some index of biomass accumulation. Losing a soil's plant growth capacity also means losing the site's ability to sustain timber production and other important ecological values. Soil productivity is affected by soil bulk compaction, soil displacement, and by changes and reductions in soil nutrients. Litter, humus, soil wood, and certain key properties of the surface mineral layers of forest soils are most easily and commonly disturbed by yarding activities, yet they are crucial to forest productivity. Soil compaction reduces soil productivity and vegetation growth rate by decreasing soil porosity and increasing density, which in turn inhibits productivity by reducing water and nutrient holding capacity, root respiration, and microbial activity. Minimizing the amount of disturbance and compaction would generally improve stand development and watershed hydrology. The Medford District RMP/EIS provides a series of BMPs designed to prevent adverse levels of degradation to the soil resource and related productivity (Vol. 2, pp. 30). Medford District BMPs limit the amount of compaction to 12% of the harvested area, and limit productivity reductions to 5%.

Presently, an estimated maximum of 5.5% (865 acres) of the soils within the Windy Creek (15,700 acres), 4.9% (680 acres) of the soils within Fortune Branch (13,871 acres), and 5.0% (910 acres) of the soils within Quines Creek (18,142 acres) Hydrologic Unit Category (HUC) 6 sub-watersheds are disturbed to varying degrees due to past disturbance and road construction on public and private lands (Medford Change Detection, 1974-2002, field observations, and BLM past projects data). Disturbance was calculated by taking the total acres harvested by each yarding type, multiplied by a research derived percentage for the amount of disturbance created as a result of each of the various yarding techniques. These values were then converted into the percentage of acres that were disturbed within each HUC 6 sub-watershed (disturbed acres divided by total watershed acres). Megahan (1980) found that clearcut tractor logging disturbed 21% of the ground and that clearcut harvest cable yarding disturbed 7%. For past disturbance the total amount of disturbed soil was calculated assuming that 60% of the units were tractor logged clearcuts, and the rest were cable yarded clearcuts, as clearcut logging was historically the most common harvest technique used on both public and private land. This is an over-estimate because 61% these acres were cut over 10 years ago, so some reduction in bare soil, top soil erosion, and compaction has occurred as a result of revegetation. Additionally on federal land, many of these units were commercially thinned, following the implementation of the NFP in 1994. In commercial thinning units disturbance estimates are reduced by almost 40% when compared to clearcuts (Megahan, 1980). For estimated harvested acres observed in the field, and known acres that have been recently harvested from 2002 through 2005, disturbed ground was calculated using a 40% tractor, 55% cable, and 5% helicopter yarding estimate, to more accurately represent modern logging practices.

A total of 4.4% (690 ac) of Windy Creek HUC 6 sub-watershed is estimated to presently be compacted as a result of timber management activities and existiing roads, in Fortune Branch HUC 6 sub-watershed 4.1% (570 ac) is compacted, and 4.2% (755 ac) of Quines Creek HUC 6 sub-watershed is currently compacted. Disturbed ground was estimated to be 75% compacted on tractor units, and 60% compacted on cable units, based on research from Sidle, 1980 (EPA Non-Point Pollution Website). Helicopter units were also assumed to have 60% compaction of disturbed acres because no research was found to support a lesser percentage. Road acres were assumed to be 100% compacted, and are based on a 20 foot road width.

Productivity loss from past harvest and road construction within these sub-watersheds is approximated to be 3.5% (550 ac) in Windy Creek, 3.4% (480 ac) in Fortune Branch, and 3.5% (632 ac) in Quines Creek. Productivity loss from timber harvest related compaction and topsoil disturbance was calculated as 50% of the disturbed area within units, based primarily on research by Froehlich and McNabb, (1984), and calculated as a 100% reduction in productivity on road acres.

Within Windy Creek HUC 6 sub-watershed roads currently occupy approximately 240 acres of ground (1.5% of the HUC 6), in Fortune Branch roads occupy about 280 acres (2.0% of the HUC 6), and in Quines Creek approximately 355 acres (2.0% of the HUC 6) of roads currently exist. Roads were considered, during the analysis of baseline conditions, to be a 100% loss to productive lands within this planning area. Roads acres were included in the above calculations for disturbance acres, compaction acres, and acres of productivity loss.

Fuels reduction treatments, in addition to reducing fire hazard, generally reduce the amount of vegetation competing for soil nutrients and water, thus increasing site productivity. 350 to 400 acres of fuels treatments are currently being implemented, independent of this project proposal, within this Planning Area to reduce fire hazard within Wildland-Urban Interface (WUI) areas, and to improve stand health. In addition to protecting WUI areas, these treatments reduce the likelihood of a more intense, uncontrolled wildfire from occurring. Heat resulting from large scale and intense fires can damage soil biology such as mycorrhizae, nitrifying bacteria, and other soil organisms in proportion to burn intensity, adversely affecting soil productivity for up to 10 years (Barnett, 1989). 33 wildfires have been reported in this Planning Area within the last 10 years. Most of these were relatively small, with 82% being under 0.25 acres and 97% being less than 10 acres in size. The extent of the loss to soil productivity, though expected to be a relatively small percentage of the acres that have burned, has not been measured. However, acres that resulted in overstory canopy closures being primarily eliminated, and as such, detectable by satellite imagery, were included in the Medford Change Detection analysis, and are accounted for within the soil disturbance and productivity loss percentages discussed in the previous paragraph. Where a majority of the overstory was not consumed by fire, satellite imagery did not identify open space conditions, and thus these acres were not accounted for.

Past regeneration harvest (RH, OR) activities on federal land and clearcutting on non-federal land has converted 11,648 acres of mature stands to young plantations. These management activities result in stands with smaller trees that are less fire resistant but this does not necessarily exacerbate fire intensity or increase a fire's potential to reduce soil productivity. Therefore, these regeneration harvest acres are not included in the productivity loss estimates listed above.

Non-commercial and commercial thinning treatments also benefit soil productivity by effectively increasing water and nutrient availability. Approximately 3600 acres within this Planning Area currently have young (20-80 yrs), dense stands that are a product of past timber management activities and aggressive fire suppression activities (Forest Operations Inventory database). Many of these stands are currently showing reduced growth rates as a result of overstocked conditions that are causing competition for soil nutrients and water.

Erosion

Soils in this watershed are generally stable on most hillslopes under 65% in both upland forested stands and riparian areas and are not actively experiencing a great deal of erosion. However, slopes over 65% are common within this Planning Area. In addition to reducing productivity, displaced soil often becomes mobilized, potentially accelerating sediment delivery to streams. Forest management activities related to timber harvesting such as yarding corridors, skid trails, temporary and permanent road construction, road use, culvert replacements, road improvements, and decommissioning, can result in accelerated erosion on all soil types within this planning area. The NRCS Douglas County Soil Survey Manual states that the steepness of these slopes and the hazard of compaction and erosion associated with timber management activities on these soils is a concern. As discussed above, approximately 5.5% of Windy Creek, 4.9% of Fortune Branch, and 5.0% of Quines Creek sub-watersheds have been disturbed by yarding corridors, skid trails, landings, and road building associated with past harvest activities. Timber harvest activities can remove ground litter and topsoil, displace, and compact soils. Where logging operations result in exposed soil, surface erosion can occur when rain splash or overland flow causes the detachment of soil particles during wet conditions (sheet erosion), or when gravitational and wind movement causes detachment of particles during dry whether conditions (dry ravel). These processes typically result in soil being removed uniformly over the entire exposed area (NOAA Fisheries, 2004). Vegetative cover reduces the particle detachment rate, and through the binding capacity of root masses, the sediment transport rate (NOAA Fisheries, 2004, (Larson and Sidle, 1981; Harvey et al. 1994)). Therefore surface erosion, from disturbed soils that are not compacted, is normally greatly diminished within 3-5 years, following the regrowth of vegetation. Additionally, there are management techniques that would greatly reduce the amount of erosion from a timber management operation. For example, soils protected by litter are less prone to erosion (SOLO, 2006 (Rothacher and Lopushinsky 1974)). Therefore by limiting the amount of surface disturbance and the amount of exposed soil, erosion can be reduced.

The Medford District RMP/EIS recommends several BMPs to guide federal forest projects that are designed to reduce the amount of ground that is disturbed during timber management activities, as well as the amount of erosion that moves off-site. BMPs are also designed to keep stream sedimentation within the Oregon Department of Water Quality (ODEQ) water quality standards, the Clean Water Act, and ACS objectives of the NFP. Timber management on federal lands has been done using these recommendations since the adoption of the NFP in 1994. Some of the management practices that have been, and continue to be, used on federal lands include maintaining and improving riparian zones, applying seasonal restrictions to unsurfaced roads and tractor yarding activities, and taking special precautions when managing stands on unstable or fragile soils. BMPs recommend that projects are designed using partial suspension for all yarding activities, and where exposed soil may result in accelerated erosion, waterbars, seeding, and mulching should be applied. Without BMPs, yarding corridors can form rills and gullies, with the potential to become small intermittent streams. This can adversely affect groundwater storage and summer stream recharge at, or below, these sites by channeling what would otherwise have been subsurface flow to the surface. Using waterbars, seed, and mulch would reduce the erosion potential from rain splash and channeled surface flow at these sites. Without mitigation, tractor skid trails can remain unproductive for one or more decades, and many would become chronic sources of sediment where they are in close proximity to the stream. To reduce these impacts BMPs recommend that all skid trails be subsoiled, in addition to being seeded or planted, water barred, and mulched prior to the first rainy season following harvest. Since tractor harvest only occurs on relatively gentle slopes on federal lands (less than 35%), little erosion should occur when mitigation measures are properly implemented. Up to 80% of site productivity should be restored within a year or two following subsoiling. Additionally projects should minimize the amount of open area created, while still meeting project objectives, so that fewer acres are vulnerable to erosional events such as rain splash, and rain or snow events. For the past decade, these practices have been implemented on federal grounds, resulting in less erosion, and as a result less material is available to transported offsite to streams.

Because timber harvest activities on non-federal lands generally result in more exposed soils, surface erosion from past disturbance activities on non-federal lands would be expected to result in a greater amount of erosion, and an increase in the offsite transport of this erosion, than would occur on federal lands which are managed using more restrictive BMPs and PDFs. This would result in a moderately high risk of stream sedimentation for about 1-3 winters, becoming minimal within 3-6 years following harvest due to rehabilitation measures and the reestablishment of vegetation and organic matter over bare soils. Approximately 8115 acres (75%) of past disturbance within this Planning Area is on non-federal lands. Of these acres, approximately 2855 acres (6% of the combined total acreage of Windy Creek, Fortune Branch, and Quines Creek HUC 6 watersheds) are estimated to have been clearcut harvested on private land in the last 6 years. Because these sites should be planted within 3 years as required under the Oregon Forest Practices Act, and be "healthy and out-competing other vegetation within 6 years", it would be expected that these acres cut in the last 6 years (up to 3 years to plant, and up to 3 years for root systems to become established and provide structural support for soils) would be contributing most of the sediment entering streams from non-road related surface erosion.

Additionally, across all ownerships many yarding corridors and tractor skid trails were not rehabilitated within past harvest units prior to the NFP within these sub-watersheds. In some areas, this disturbance has resulted in rills and gullies. Where poorly rehabilitated units are hydrologically connected to the streams through road systems, or are adjacent to streams that have little or no riparian buffer, these areas have become chronic sources of stream sediment.

Timber harvest prescriptions such as clear-cutting, regeneration harvest, and overstory removal have created open space within this watershed that is vulnerable to erosional events such as rain splash, and rain or snow events. The term open space in this document refers to acres that do not have trees over the age of 30 years of age (stands that are not hydrologically recovered), or stands that have canopy closures less than approximately 30%. On non-federal land, and federal lands harvested prior to the NFP (1994) many of these stands are truly open as a result of clearcut harvest, whereas on federal lands harvested since 1994, most open space stands have 6-8 overstory conifers per acre, plus hardwoods. However, though these harvest techniques are beneficial in terms of keeping a majority of the erosion onsite within the remaining vegetation, and stabilizing soils on steep slopes, in terms of hydrologic processes, such as peak flow increases and water yields, these acres still function as open space, and thus have been analyzed together with true clearcut acres.

Watersheds with open space in excess of 25% have a greater potential for increased water yields, and in instances where more than 25% of the TSZ is also in open condition, the potential for peak flow augmentation is also increased. Studies show that the magnitude of the peak flow is increased as the size of the watershed is reduced (Church and Eaton, 2001). TSZ openings are most likely to lead to surface and channel erosion within a watershed when either a majority of the acres within the TSZ are in open space condition and the TSZ occupies a majority of the watershed at the HUC 6 or larger scale (WPN, 1999); where open space in the TSZ is concentrated within a HUC 7 or HUC 8 basin within a larger HUC 6 watershed (Church and Eaton, 2001); or where open acres in excess of 25% are concentrated within the headwaters of a particular stream network, causing intensified localized effects instead of smaller dispersed effects that may be immeasurable within several stream networks throughout a watershed.

The Medford Change Detection tool was used to determine which HUC 6 and HUC 7 watersheds in this Planning Area presently exceed the 25% open space trigger point where a further analysis is recommended prior to additional management activities, due to the potential for measurable increases in peak flows and water yields. This tool inventories all forested stands (rock outcrops, agricultural lands, etc. are not included as they are considered a permanent non-forested condition to which the watershed has previously adapted) that have been disturbed in the past 32 years, and that currently have limited canopy closure conditions (generally less than 30%) which are likely to be affecting hydrologic processes. This tool does not explicitly take into account that hydrologic recovery is occurring as stands age and revegetate. It does however group together a range of years in which the open space was created (ie. 1974-1984, 1984-1989, etc.), which allows for the person doing the analysis to take into account where hydrologic recovery may be reducing some of the impacts related to the open space condition. Forest vegetation is generally considered to be in an advanced stage of hydrologic recovery 20 years after disturbance, and substantially complete by age 30 (Harr, 1989; Adams and Ringer, 1994). Hydrologic recovery is considered to be the point at which hydrologic processes such as peak flows, runoff timing, and water yields within a harvested stand have returned to pretreatment conditions. The amount of acres presently in an advanced stage of hydrologic recovery has therefore been taken into consideration when the risk assessment regarding the potential for peak flow increases that could lead to channel erosion, and water yield enhancements, were made. See Section 3.4.2 Watershed Hydrology, for relevant research used to support conclusions made regarding potential impacts from open space conditions.

Including road acres, the Windy Creek HUC 6 sub-watershed currently has approximately 4400 acres (28%) in open condition, with about 1785 acres (36%) open space within the transient snow zone (TSZ). The TSZ comprises approximately 32% of this sub-watershed. As a result of these percentages, Windy Creek HUC 6 was further considered for possible pre-existing hydrologic effects that may be currently occurring as a result of open space condition from past disturbance. As shown in Table 3-8 and Table 3-9 below, approximately 26% (years 1974 – 1989) of these acres are currently at, or approaching, an advanced stage of hydrologic recovery, within this HUC 6, with up to 36% nearing advanced recovery stages in the TSZ. These acres in advanced stage of hydrologic recovery, though still impacted, would be expected to be causing a reduction in any effects that may be occurring as a result of existing open space. Because of the reduced impacts on acres that are currently nearing hydrologic recovery, the relatively low percentage of road acres within this sub-watershed, and because the sub-watershed is currently just 3% above the point at where research indicates that hydrologic effects may become measurable, it was determined that the magnitude of any increases in peak flows, if present, would be too small to be causing an increase in channel erosion within this sub-watershed at the HUC 6 level. Fortune Branch HUC 6 currently has approximately 3,250 acres (23%) in open condition, including road acres, with about 445 acres (20%) of open space occurring within the TSZ. The Quines Creek HUC 6 sub-watershed has approximately 4005 acres (22%) considered to be in open space condition, with about 1,425 (22%) in the TSZ. Because these sub-watersheds were below 25% both within the entire HUC 6 and the TSZ, and road acres were below the point where hydrologic effects have been shown to become measurable, these watersheds were not considered to presently have any potential for peak flow increases, and were not further investigated at the HUC 6 level. However, all of these sub-watersheds were further investigated at the HUC 7 drainage level, to determine if current open space conditions, at this more localized scale, could currently be causing an increase in erosion that may be affecting beneficial uses.

Table 3 - 8. Past disturbance

Years of disturbance	Years since disturbance	Windy Creek HUC 6 acres disturbed (% of total disturbance)	Fortune Branch HUC 6 acres disturbed (% of total disturbance)	Quines Creek HUC 6 acres disturbed (% of total disturbance)	Planning Area – Total disturbed acres for all three HUC 6 (% of total disturbance)
1974 - 1984	22 - 32	362 (9)	286 (10)	430 (12)	1078 (10)
1984 - 1989	17 - 22	693 (17)	461 (15)	868 (24)	2022 (19)
1989 - 1995	11 - 17	1729 (41)	701 (24)	1090 (30)	3520 (33)
1995 - 1999	7 - 11	323 (8)	462 (15)	417 (11)	1202 (11)
1999 - 2002	4 - 7	573 (14)	938 (32)	564 (15)	2075 (19)
2002 - 2005*	0 - 4	480 (11)	120 (4)	280 (8)	880 (8)
Totals		4160 (100)	2968 (100)	3649 (100)	10777 (100)
Roads Acres		238 acres	278 acres	355 acres	871 acres
Total Open		4398	3246	4004	11648

* 2002 – 2005 data is not currently available using the Medford Change Detection analysis and is therefore based on past BLM activities and field observations. Field observations are only rough estimates.

Table 3 - 9. Past disturbance within the TSZ

Years of disturbance	Years since disturbance	Windy Creek TSZ acres disturbed (% of total disturbance)	Fortune Branch TSZ acres disturbed (% of total disturbance)	Quines Creek TSZ acres disturbed (% of total disturbance)	Project Area – Total disturbed acres for all three HUC 6 TSZ's(% of total disturbance)
1974 - 1984	22 - 32	252 (15)	102 (26)	305 (23)	659 (19)
1984 - 1989	17 - 22	355 (21)	99 (25)	383 (29)	837 (25)
1989 - 1995	11 - 17	650 (38)	53 (14)	333 (25)	1036 (30)
1995 - 1999	7 - 11	171 (10)	28 (7)	194 (15)	393 (11)
1999 - 2002	4 - 7	150 (9)	69 (18)	72 (5)	291 (9)
2002 - 2005*	0 - 4	120 (7)	40 (10)	40 (3)	200 (6)
Totals		1698 (100)	391 (100)	1327 (100)	3416 (100)
Roads Acres		88 acres	53 acres	100 acres	241
Total Open		1786	444	1427	3657

* 2002 – 2005 data is not currently available using the Medford Change Detection analysis and is therefore based on past BLM activities and field observations. Field observations are only rough estimates.

Three of the seven HUC 7s within the Windy Creek HUC 6 sub-watershed account for most of the TSZ open space disturbance. Windy 0409, 0418, and 0421 HUC 7's currently have 37%, 49%, and 61%, respectively, of their TSZ acres in open condition. These three

HUC 7 drainages account for approximately 57% of the total TSZ acres within the Windy Creek HUC 6 sub-watershed. The 0418 and 0421 HUC 7 drainages also account for almost 69% of the total open space within the Windy Creek HUC 6 sub-watershed, with 53% currently open in the 0418 drainage and 30% open in the 0421 drainage. There is also one HUC 7 drainage within the Fortune Branch HUC 6 that is currently above 25% open space within the TSZ, the 0318 drainage (See Table 3-10 section 3.4.2.1), and four drainages that exceed 25% total open space (0309, 0318, 0324, and 0327) as a result of past disturbance. Research indicates that as the size of a watershed decreases, the potential for hydrologic impacts increases (Church and Eaton, 2001). Based on research by Harr et al. (1979) peak flows in these HUC 7 drainages could potentially be locally augmented by up to 11% due to present open space conditions. As such, all these HUC 7 drainages above were considered to be at risk for experiencing localized increases in erosion independent of the potential impacts that could occur if the proposed project were to be implemented, and as a result were investigated further. It was determined based on the amount of TSZ openings, the total amount of drainage open space, the location and acres of hydrologic recovery of the existing open space, and the number of road acres within each drainage, that only the Windy Creek 0418 and 0421 drainages would likely still be experiencing measurable increases in peak flows and water yields that would be contributing to increased channel erosion considerable enough to be affecting localized beneficial uses (See section 3.4.2.1 Watershed Hydrology).

Roads modify hydrology both through interception of precipitation on the road surface, and through interception of subsurface flow (Wemple and Jones, 2003 [Megahan and Clayton, 1983]). This can cause increased channelization of hillslopes and mass wasting (Wemple and Jones, 2003). Un-maintained and poorly maintained roads, and native surface roads used for winter haul, are the largest ongoing sources of erosion in this watershed (Middle Cow Creek WA, 1999). Un-vegetated ditchlines, road surfaces, and cross drains all mobilize eroded soils. Ditchlines along roads also increase the rate of transport of intercepted water and sediment to stream channels. Studies have shown that roads can contribute 50-80% of the sediment that enters streams (Hagans et al., 1986). Over 50% of the roads within the Windy Creek HUC 6, approximately 34% of the Fortune Branch HUC 6, and about 37% of the Quines Creek HUC 6 are native surface roads, and in the Middle Cow Creek HUC 5, 53% of the streams are within one site potential tree length (185 feet) of a road. Many of these existing roads that are within 185feet of a stream, cross streams, or have cross drain culverts that connect with streams and riparian areas, meaning that the hydrologic connectivity between the roads and streams is relatively high in this Planning Area. Relatively high fine sediment loads, found during ODFW Stream Habitat Surveys in portions of Windy, Wood, Bear, Lawson, and Fortune Branch Creeks in this planning area, would be expected to frequently be a result of erosion from road use and maintenance on these hydrologically connected roads. Road densities in all three sub-watersheds currently exceed the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) target of 2 mi/mi^2 for streams to be considered in properly functioning condition. (NOAA Fisheries, 2004). Windy Creek road density was calculated using GIS at 3.9 mi/mi^2, Fortune Branch at 5.1 mi/mi^2 and Quines Creek at 5.0 mi/mi^2. This includes federal, state, and private roads, most of which have existing right of way agreements that take precedence over USFWS/NOAA Fisheries targets, and recommendations within the Middle Cow Creek Watershed Analysis to decommission roads.

Severe fires can increase the risk of dry ravel and rill erosion on severely burnt, steep sites by reducing the adhesive properties of water found within the organic matter, microbes, fungal filaments, woody debris, and roots in the soil matrix (Barnett, 1989). Some signs of accelerated erosion can be seen within this watershed on sites that have previously burned, however, most recent fires within this watershed have been relatively small (see soil productivity above), and many have been quickly suppressed, reducing the amount of area prone to severe burning. Where present in these watersheds, most of these sites appear to have partially recovered with the re-growth of vegetation and water retaining organic ground cover, such as logs, branches, and other forest debris. On approximately 11,648 acres within this planning area, regeneration harvest (RH, OR) on federal lands, and clearcutting on non-federal lands has converted generally more fire resistant mature stands into young plantations that are typically more prone to fire due to their horizontal continuity. Fuel reduction treatments, ongoing in this Planning Area, help to reduce the probability of an intense, large scale wildfire occurring by reducing fuel loading and horizontal continuity within the stand.

Mass Wasting

Mass wasting alters site productivity, increases erosion and potential stream sedimentation, and damages road systems. The risk of large scale mass wasting within this Planning Area is low, as soils in this region are generally not prone to debris flows or other large scale events. Field observations and aerial photos do also indicate that large scale mass wasting is rare within this planning area. However, small slumps and slides are not uncommon in this planning area, and are found to occur throughout this planning area, primarily at contact points between different geologic formations and near faultlines, or in association with roads. Faultlines in this Planning Area are dispersed, but occur primarily along Wood Creek, Woodford Creek, and Windy Creek Drainages, and in numerous locations in the upper reaches of the Fortune Branch HUC 6 sub-watershed. Geologic contact zones are, for the most part, in the upper reaches of Fortune Branch and Quines Creek HUC 6 sub-watersheds where a granitic intrusion is present, and along Cow Creek and the lower reaches of Windy Creek where the Galice Formation contacts alluvial soils associated with these streams. Roads increase the risk of small slides and slumps occurring in this planning area, especially if they are not near a ridge, are not outsloped, or have poor drainage. Timely culvert and cross drain maintenance is important to keep channelized water from backing up behind the road fill and causing roads to fail. Road densities, discussed above, are relatively high, and a majority of these roads are located below ridges where subsurface water can be intercepted and re-routed to ditchlines and cross drains, which can increase the risk of failure.

It appears that where wildfires have burned within this watershed a few small, isolated slides have occurred. This is typically seen within the headwalls of streams, near fault lines, and on steep slopes, where the soil cohesion was reduced when roots and other stabilizing materials within the soil were burnt.

3.4.1.2 Environmental Effects

Alternative 1 (No Action)

Productivity
Under Alternative 1 there would be no change in productivity as a result of this project, because projected related compaction changes would not occur. All current recovery and stocking trends would remain the same until such time that another action was implemented, either on non-federal lands, or on federal lands under a future NEPA document. There are no known future timber management projects within this Planning Area on Federal lands. The ODF New Notifications and Renewals report for December 1, 2005 (Copies available at the BLM Grants Pass Interagency Office) indicates that approximately 2400 acres of timber harvest would occur within this Planning Area independent of this project in the near future. These activities could result in up to 265 acres of disturbance that would result in a 0.8% reduction in productivity within this planning area, assuming 40% tractor, 55% cable, 5% helicopter yarding was used (roughly estimating modern logging system use). Existing compacted acres would continue to slowly improve over time as tree roots, and other natural processes begin to break apart soil particles. Hazardous fuel and non-commercial thinning treatments, which generally reduce the amount of vegetation competing for soil nutrients and water thus increasing stand productivity and the development of large woody debris (LWD) within riparian stands, would be deferred or only occur in conjunction with other ongoing projects. Hazardous fuel reduction projects would still be implemented on approximately 350-400 acres in conjunction with other projects under this alternative which would reduce the likelihood of a higher intensity, large scale uncontrolled fire that would otherwise likely reduce productivity on some sites in the long and short term.

Erosion
Under the No Action Alternative, erosion levels would be unaltered in this Planning Area as a result of this project. Existing chronic sediment sources currently present on many hydrologically connected, natural surface roads throughout this Planning Area would continue. Because only scheduled maintenance would occur under the No Action Alternative many roads would continue to deteriorate and chronically erode over time. Clear-cutting on approximately 800-900 acres would be expected to occur on non-federal land in this Planning Area within the next 1-3 years (ODF New Renewals) independent of this project. This would result in accelerated erosion due to bare soil conditions and increased open space acres within the TSZ. TSZ harvest would likely cause some increases in peak flows within HUC 7 watersheds that are presently above, or would be taken above as a result of these harvest activities, 25% open condition within the TSZ, potentially resulting in channel erosion depending on the watershed characteristics and the specific locations in which the harvest occurs. Long term fire hazard would continue to increase over time since only 350-400 acres of hazardous fuels treatments would occur in conjunction with other ongoing federal projects in this Planning Area, and dense stands would begin to develop larger amounts of dead and dying trees as stands compete for water and nutrients. An increase in fire hazard would slightly increase the chance of dry ravel and

rill erosion sites developing as a result of the severe fire activity that is associated with heavy fuel loads and dry weather burning conditions.

Mass Wasting

No roads would be added or removed under this alternative. Road maintenance and improvements, such as replacing failing cross drains, that can become clogged and cause roads to slide, would only occur on roads scheduled for maintenance under the Glendale yearly maintenance plan, or as a result of emergency situations. Roads would continue to deteriorate, reducing drainage efficiency, and increasing the likelihood of small slumps and slides over time. Long term increased fuels loads due to natural stand competition in overstocked stands and untreated ladder fuels, would increase the chance of a severe fire destroying large trees, and the root systems of these trees, which typically help to stabilize soils within these watersheds. As such, this alternative would not reduce the risk of mass wasting.

Alternative 2 (Proposed Action)

Productivity

Minimizing the amount of soil compaction and top soil displacement would generally improve stand development and watershed hydrology. The Medford District RMP/EIS provides a series of BMPs designed to prevent adverse levels of degradation to the soil resources and related productivity (Vol. 2, pp. 30). Following these BMPs keep soil impacts within the guidelines of the RMP through restricting the amount of land affected, requiring mitigating measures, and by rehabilitating sites where long-term reductions in productivity would otherwise be expected. The RMP requires less than 12% ground compaction (RMP, p. 166), and that productivity losses do not exceed 5% (RMP/EIS p. 4-13) both within each harvest site, and within the Planning Area as a whole. Project Design Features (PDFs, Section 2.3) that are included in the Action Alternatives ensure that compaction and productivity losses remain below these requirements at the unit scale, therefore this analysis was done to ensure compliance at the Planning Area level.

Alternative 2 would result in soil compaction and top soil erosion that would reduce localized areas of soil productivity. The amount of land affected would include approximately 72 acres of tractor yarding corridors, 87 acres of cable yarding corridors, 21 acres of helicopter yarding, 1.5 acres of new permanent road and up to 15 acres of new temporary road acres (to be decommissioned after use), the renovation of up to 20 acres of helicopter landings, and the expansion of 4 rock quarries of up to 25 total acres. Together, the incremental effects of disturbance from yarding corridors, roads, landings, and quarries would cause up to 176 acres (0.5%) of compaction, and productivity losses equaling the equivalent of up to 141 acres (0.4%) within this Planning Area. In this analysis, yarding acres were calculated using modified research values from Megahan (1980) for clearcut and commercial thin treatments. Regeneration harvesting and overstory removal, which are not as extensive as clearcutting operations but more impactive than commercial thinning were estimated to result in compaction on as much as 6% of cable harvest units, 3% of helicopter-logged units. Because BMPs (Medford RMP Standards and Guides) and PDFs (section 2.2) minimize the number and width of skid trails and impose seasonal use restrictions that ensure that all tractor units are kept at or below 12% compaction, and below a 5% loss in productivity loss, tractor logging units were calculated at 12% for all units. For commercial thinning, compaction was estimated to occur on as much as 4% of cable harvest units, 1% of helicopter-logged units. See Section 3.4.1.1; Productivity, for original research values for clearcut logging.

In Windy Creek HUC 6 sub-watershed, timber harvest would result in soil disturbance from yarding corridors on approximately 67 acres, 5 acres of new temporary roads, 1.5 miles permanent road (shared ridge between Fortune Branch and Windy Creek HUC 6 sub-watersheds), the renovation or construction of up to 10 acres of helicopter landings, and 2 expanded quarries. This would result in compaction and productivity losses of, 69 acres (0.4%) and 53 acres (0.3%) respectively, within this HUC 6, as a result of Alternative 2.

In the Fortune Branch HUC 6 sub-watershed, timber harvest would result in soil disturbance from yarding corridors on approximately 103 acres, 9 acres of temporary roads, 1.5 acres of permanent road, up to 8 acres of helicopter landings, and up to15 acres of quarry expansions. This would result in approximately 98 acres (0.7%) of compaction and an approximate equivalence of 81 acres (0.6%) productivity loss would occur within this HUC 6 as a result of Alternative 2.

In Quines Creek, timber harvest would result in soil disturbance from yarding corridors on approximately 10 acres, 0.2 acres of temporary roads, and up to 2 acres of helicopter landings, This would cause compaction to occur on about 9 acres (0.05%), with productivity losses equivalent to up to 7 acres (0.04%) within this HUC 6 as a result of Alternative 2.

Only permanent road acres and rock quarry expansions would be expected to be a permanent loss to the productive land base. Yarding corridors, landings, and temporary roads would be rehabilitated where necessary to ensure productivity on these lands is restored. Sub-soiling of up to 80 acres of existing and new tractor trails in units 5-04, 8-02, 8-1, 9-18, 9-1, 9-17, 17-1, 31-1, 31-8, 33-2B, 1-1, 3-4W, 3-1W, 5-2W, 11-2W 11-3W, 13-1, 14-2W, 15-2, 23-2, 4-19S, 4-3S, 5-10S, 5-8S, 5-7S, 5-9S, 3-8W, where practical, and 6.1 miles of temporary logging roads (See PDFs, Section 2.3.7) would reduce compaction within these units by as much as 80% (Froehlich and Miles; Davis), substantially restoring the infiltration of water and nutrients into the soil.

Baseline compaction within these watersheds, discussed in the affected environment previously, is 4.4% (690 ac) of Windy Creek HUC 6 sub-watershed, 4.1% (570 ac) in Fortune Branch HUC 6 sub-watershed is compacted, and 4.2% (755 ac) of Quines Creek HUC 6 sub-watershed. Under Alternative 2 this project would add less than 1% compaction in all watersheds, thus compaction would remain well below the maximum 12% compaction standard at the Planning Area level. (RMP, p. 166) Because BMPs and project design features such as maximum skid trail widths, 150 foot separation requirement for skid trails, and seasonal restrictions would be implemented, compaction would also below 12% at the harvest unit scale.

Productivity loss from past harvest and road construction within these sub-watersheds is approximated to be 3.5% (550 ac) in Windy Creek, 3.4% (480 ac) in Fortune Branch, and 3.5% (632 ac) in Quines Creek. Under Alternative 2 productivity losses in Windy Creek HUC 6 would be approximately 0.3% for a total of about a 3.8%, in Fortune Branch HUC 6 approximately 0.6% for a total of 4%, and in Quines Creek HUC 6 sub-watershed about 0.04% for a total of 3.54%. Therefore, under this alternative productivity losses would not exceed 5% (RMP/EIS p. 4-13) within the Planning Area, and due to BMPs and PDFs, within each harvest unit.

Hazardous fuel reduction treatments on approximately 988 acres, and non-commercial density management treatments primarily within the ecological protection zones adjacent to units, would reduce the amount of vegetation competing for soil nutrients and water, thus increasing site productivity within treated stands. The isolated pile and burn, and underburning activities are low intensity, reducing the depth the soil is affected, and generally leave a significant portion of the larger organics on site. This helps to maintain the productivity of the site in the long term, with an immeasurable short term effect. Hazardous fuel treatments would also reduce the likelihood of a high intensity, large scale uncontrolled fire from occurring, which could otherwise reduce site productivity of severely burned acres for one or more decades.

<u>Erosion</u>

Measuring the amount of sedimentation that results from the movement of eroded materials offsite and into streams has generally been unsuccessful, and there is no known research data, relative to this region, that is able to provide this information. For this reason, erosion, and subsequent stream sedimentation, has been done in this analysis using the Medford District RMP guidance which states that projects would be in compliance with the Oregon water quality standards, and ACS objectives under the NFP, where BMPs are implemented to minimize the amount of eroded material, and the transport of that material offsite (RMP, 151).

Timber harvest and hauling operations would result in an increase in surface erosion within harvested stands and along roads. Within the Planning Area, approximately 180 (0.54%) acres of would be disturbed, potential resulting in bare soils or compaction that would be subject to erosion as a result of timber yarding under this alternative. Within Windy Creek approximately 67 acres (0.4%) of disturbance would result from yarding corridors (and skid roads) under this Action Alternative. In Fortune Branch yarding corridors would result in about 103 acres (0.7%) of disturbance, and in Quines Creek disturbance would occur on approximately 10 acres (0.06%) under Alternative 2.

All disturbed land that results in bare soil conditions, or compaction would have the potential for erosion, but mitigation following harvest such as waterbars, spreading seed and mulch, and sub-soiling of skid trails would reduce the amount of erosion that occurs to the point where productivity losses do not exceed 5% and Oregon water quality standards are not exceeded. BMPs and PDFs used in this project would also be expected to keep nearly all erosion resulting from yarding corridors, landings, quarry expansions, and permanent ridge-top road construction, primarily onsite, or within adjacent downslope vegetation and Ecological Protection Zones. This would also be expected for road maintenance, renovation, and use on roads that do not have a direct hydrologic connection to a stream. During harvest, seasonal restrictions, a requirement of one-end suspension for yarding, and limitations on yarding techniques, would be used to minimize erosion (see PDFs **Section 2.2**). The exception would be on units 3-11, 4-4, 5-12, and 8-2 which would be downhill yarded. These corridors would be generally expected to result in erosion levels above those that would occur when BMPs are followed; however, these units do not occur in close proximity to any mapped streams and are not hydrologically connected to the stream, therefore with the rehabilitation that would occur on yarding corridors within these 96 acres, it would be expected that no sediment from these corridors would result in stream sedimentation, and that most erosion would be controlled prior to the wet season, and therefore primarily kept within the units. All yarding corridors with more than 50% exposed mineral soil would be rehabilitated following harvest using waterbars, mulch, and seed as necessary to prevent gully erosion. EPZs within riparian reserves would further act to keep erosion from entering waterways. These buffers were designed to be extensive enough to filter out nearly all upslope sediment that enters them, resulting in undetectable levels of stream sedimentation from all upslope sources, expect in cases where buffers are compromised by hydrologically connected roads. Where hydrologically connected roads occur, other mitigating measures such as rocking of the road surface, and seasonal use restrictions would minimize the amount of sedimentation, keeping it within ODEQ water quality standards and levels anticipated within the RMP/EIS. On all units except unit 17-1c, the use of existing haul roads would be the only ground disturbing activity within the EPZ. In unit 17-1c up to two pieces of heavy equipment would be allowed to cross through the EPZ and stream channel two times; once to access the unit, and once upon completion of harvesting activities, to exit the unit. Crossing of the stream channel would be designated by the area hydrologist and engineer, and would be done using a pre-designed log, natural bottom, or mat ford, located at a 90 degree angle to the channel. This ford would be removed following use, along with the appropriate erosion control devices. This would reduce the amount of sediment that remains within the streams to the greatest extent possible. The streambanks would also be stabilized and built up to redirect flow back into the historic channel that this stream naturally flowed through prior to being redirected as a result of skid road compaction during past logging operations. An existing in-stream culvert would be replaced downstream of this unit on road 32-5-17, sized to accommodate the additional flow that would occur within this channel as a result of redirecting the natural flows back into the channel. Implementation of this project would cause a minor increase above existing levels in the amount of stream sediment deposited immediately below the crossing site, primarily due to the rebuilding of the streambanks. This sediment would be expected to be undetectable following the second or third bankfull event of the first winter, which would normally occur between November and February of a typical precipitation year. All PDFs and BMPs for in-stream culvert projects, including sediment traps and dewatering of the site, would be used. These would be expected to keep the short term effect that this project would have on aquatic habitat within levels that are considered acceptable under the NFP and Medford District RMP. Additionally, re-routing of this channel would reduce an existing chronic sediment source that is a result of continuous scour and downcutting associated with having a portion of this stream flowing outside of its natural channel, therefore improving water quality and aquatic habitat in the long term (Affects to Aquatic Habitat in discussed in section 3.4.3.2, Fisheries, Alternative 2)

Alternative 2 would result in approximately 1,377 additional acres (4.2%) of open space within the Planning Area as a result of all timber harvest units that would leave canopy closures less than 30%. Some Regeneration Harvest and Overstory Removal acres have been excluded as open space due to mitigation measures within Connectivity Blocks and some TSZ units, which require that canopy closure within these units remain above 30% (40% in connectivity). As discussed later within the watershed hydrology section of this EA, canopy closures over 30% are not considered to be open space for the purposes of hydrologic functions such as peak flow and water yield increases (WPN, 1999). At the HUC 6 scale, open space created under this alternative would not be expected to cause additional hydrologic or geomorphic changes above the current baseline conditions within this Planning Area, due to the amount of hydrologic recovery that has presently occurred within past harvest units in this planning area, and because the magnitude of any potential increases in peak flows or water yields would not be expected to be large enough to result in a measurable change in flow within these higher capacity HUC 6 stream channels (Church and Eaton, 2001). However, open space created as a result of this alternative would be expected to increase peak flows and water yields above current levels in several HUC 7 drainages, causing localized stream channel erosion. In addition to the channel erosion that is likely already occurring within the Windy Creek 0418 and 0421 drainages as a result of past disturbance, open space created by this alternative could potentially cause localized increases in peak flows within the 0306, 0324, 0409, 0418, and 0421 drainages that could potentially result in localized increases in erosion. This analysis, and the effects of in channel erosion are discussed further in section 3.4.2 Water Resources. Of these drainages, only the 0418 and 0421 HUC 7s would be expected to result in sedimentation that could affect localized beneficial uses (See section 3.4.3 Fisheries).

The construction of 0.5 miles of permanent ridge line road, the construction and decommissioning of 6.3 miles of temporary road, the expansion of up to 25 acres within 4 quarries, and the renovation and building of up to 20 acres of landings, logging traffic and maintenance on up to 22 miles of natural surface and 69 miles of rocked haul roads, and reconstruction on 2.4 miles of roads would also result in small amount of localized surface erosion that would not be expected to exceed Oregon water quality standards due to the use of BMPs during the implementation of these projects which are designed to minimize erosion and protect water quality (RMP, 151). Natural surface haul routes would be spot rocked and/or seasonally closed, as necessary, to reduce surface erosion.

The decommissioning of approximately 0.74 miles of existing road and 6.3 miles of temporary new road, as well as the maintenance and reconstruction of up to 93 miles of haul roads which are currently in varying levels of deterioration, would be expected to cause some erosion to occur during the implementation of these projects, but would result in a reduction in the chronic erosion produced by poor surface drainage, wet season use, and plugged or insufficient cross drains along these roads.

Decommissioning of a non-system jeep road by re-contouring portions of a steep roadbed that currently has two large gullies parallel to the slope due to poor drainage, and then sub-soiling to improve infiltration, would be expected to reduce chronic erosion. During heavy rainfall events, these gullies currently channel sediment into a ditchline along Fortune Branch road. Cross drains from this road are hydrologically connected to coho habitat, due to the roads close proximity to the stream, so reducing the amount of sediment that enters this ditchline would benefit fish habitat. The amount of eroded material created and transported off site from the construction, decommissioning, reconstruction, maintenance, and use of roads would be reduced by implementing BMPs and PDFs that would seasonally restrict activities where excessive erosion is likely, and that would reduce hydrologic connectivity and ditchline erosion where possible to protect streams.

Under Alternative 2 there would also be a bridge replacement project. This project would include approximately 650 feet of road realignment, 650 feet of road decommissioning, and the removal, realignment, and replacement of the existing bridge. The footings needed to install the new bridge would be outside the influence of the stream, and the entire affected area would be seeded, mulched, and replanted upon completion of the bridge replacement. However, due to the close proximity of these activities to the stream, small amounts of localized erosion that would occur, could enter Windy Creek. Since all work would be outside the stream channel, and erosion control measures would be used (Section 2.2 PDFs) these effects would be expected to be immeasurable following the first flood flow event.

Fire hazard would increase in the short term (six months to two years) in the commercial thinning units due to the presence of slash on 1,859 acres under Alternative 2. This increase in surface fuel load would be mitigated through hand piling, pile burning, underburning, or lop and scatter treatments. These activities would be of low intensity, and would leave a portion of the ground cover organics in place. Studies have shown that there are no significant losses to of organic matter with light, and moderately-light burns, and/or wet soil conditions (Burnett 1989 [Neal et al. 1965]). Therefore by treating timber harvest slash and 988 acres of hazardous fuel reduction acres, the chance of dry ravel and rill erosion sites developing as a result of the severe fire activity that is associated with heavy fuel loads, and dry weather burning conditions would be reduced for approximately 5-10 years following treatment of these acres.

Alternative 2 would be expected to have an overall short term increase in the intensity of erosion that would occur within these sub-watersheds as a result of upslope erosion, mainly as a result of maintenance and use of hydrologically connected roads, and units that are hydrologically connected to streams via ditchlines. However, the resulting mobilized sediment from upslope erosion, due to BMPs, PDFs, the disperse locations of these units, the minimal number of units within close proximity of streams, and because erosion from a majority of these actions would be expected to primarily remain on site, or within the EPZs, it would be expected that erosion from upslope sources would remain within Oregon water quality standards, and would not measurably affect water quality above existing levels at the HUC 6 scale. It would also be expected that localized increases in sediment at the HUC 7 or smaller scale would be immeasurable following the first wet season due to the transport of much of this sediment downstream, and into larger channels with more water volume, during the bankfull events that occur during the first winter.

The localized effect of erosion that occurs within the stream channel as result of increased peak flows is discussed in section 3.4.2.2, Water Resources, under Alternative 2. In-stream channel scour would be expected to cause increase sediment and turbidity within some HUC 7 watersheds. However, ODEQ water quality standards are measured at the project level, and it would not be expected that these HUC 7 effects would be measurable at the project level, the larger HUC 6 scale.

<u>Mass Wasting</u>
Geological contact zones and faults in units 15-8, 9-1, 9-3, 9-19, 17-1, 33-2, 23-5, 27-6, 27-3, and 27-1 where examined on the ground with no indications that mass wasting would result from harvest activity. Additionally units 27-1, 29-3W, 34-2, and 34-3, identified in the Middle Cow Creek watershed analysis as “potential sensitive areas” were also extensively inspected for possible mass wasting potential, with no indications of evident potential found. All other units would be examined during layout, and any potentially unstable ground that is identified would receive a no harvest buffer around it, to minimize the risk of slumps or slides occurring. However, due to the steep slopes and high road densities that are present in this Planning Area, there would be a low risk of mass wasting in units where timber harvest methods result in a loss of vegetative root structure and increased subsurface water because a majority of a stand was removed. The addition of 6.8 miles of new permanent and temporary roads would further impact hydrologic drainage patterns. However given BMPs for road building, including design techniques to reduce impacts, and because all but 0.49 miles of constructed road would be sub-soiled, mulched, and seeded, upon completion of the project, the risk of a slope failure as result of these roads would be minimal and unexpected. Additionally the .49 miles of permanent road is along a ridge and should have very little hydrologic impact. Because BMPs would be used, as well as all management actions/directions listed in the Medford District RMP (page 28) to meet ACS objectives, the minor risk associated with these roads would be acceptable under the RMP. Road and culvert maintenance on up to 93 miles of road, would help to reduce the risk of a road initiated slide by ensuring that cross drains, ditchlines, and culverts are all properly routing water downslope away from the road. By reducing the risk of a high intensity large scale fire, Alternative 2 would reduce the change of mass wasting within and adjacent to the treated acres.

Alternative 3

<u>Productivity</u>
Localized productivity loss from compaction and topsoil erosion would occur under this alternative. Under Alternative 3, approximately 70 acres of tractor yarding corridors, 72 acres of cable yarding corridors, 15 acres of helicopter yarding disturbance (see Alternative 2 for methods used to determine yarding disturbance),13 acres of temporary road construction and decommissioning, 1.5 acres of new permanent ridge road construction, the renovation or construction of up to 25 acres of helicopter landings, and the expansion of 4 quarries for a total of up to 25 additional acres, would result in land disturbance within this

Planning Area of approximately 220 acres (.66% of the planning area). Together, the incremental effects of disturbance from yarding corridors, roads, landings, and quarries would cause up to 162 acres (0.48% of the planning area) of compaction, and productivity losses equaling the equivalent of up to 118 acres (0.35%) within this Planning Area.

In Windy Creek HUC 6 sub-watershed, timber harvest would result in soil disturbance from yarding corridors on approximately 50 acres, 6 acres of new temporary roads, 1.5 acres of permanent road (shared ridge between Fortune Branch and Windy Creek HUC 6 sub-watersheds), the renovation or construction of up to 13 acres of helicopter landings, and 2 quarries expansions totaling up to 10 acres would result in compaction and productivity losses of 60 acres (0.4% of the HUC 6) and 45 acres (0.3%) respectively, within this HUC 6 sub-watershed, as a result of Alternative 3.

In the Fortune Branch HUC 6 sub-watershed, timber harvest would result in soil disturbance from yarding corridors on approximately 97 acres, 7 acres of temporary roads, 1.5 acres of permanent road, approximately 10 acres of helicopter landings, and up to15 acres of quarry expansion would result in approximately 94 acres (0.7% of the HUC 6) of compaction and an approximate equivalence of 69 acres (0.5%) of productivity loss would occur within this HUC 6 sub-watershed as a result of this Action Alternative.

Within the Quines Creek HUC 6 sub-watershed, timber harvest would result in soil disturbance from yarding corridors on approximately 6 acres, 0.2 acres of temporary roads, and up to 2 acres of helicopter landings, would cause compaction to occur within this sub-watershed on about 8 acres (0.04% of the HUC 6), with productivity losses equivalent to up to 4 acres (0.02%).

As with Alternative 2, only permanent road acres and rock quarry expansions would be expected to be a permanent loss to the productive land base. Yarding corridors, landings, and temporary roads would be rehabilitated where necessary to ensure productivity on these lands is restored.

Baseline compaction within these watersheds, discussed in the affected environment previously, is 4.4% (690 ac) of Windy Creek HUC 6 sub-watershed, 4.1% (570 ac) in Fortune Branch HUC 6 sub-watershed is compacted, and 4.2% (755 ac) of Quines Creek HUC 6 sub-watershed. Under Alternative 3 this project would add less than 1% compaction in all watersheds, thus compaction would remain well below the maximum 12% compaction standard at the Planning Area level. (RMP, p. 166) Because BMPs and project design features such as maximum skid trail widths, 150 foot separation requirement for skid trails, and seasonal restrictions would be implemented, compaction would also below 12% at the harvest unit scale.

Baseline productivity loss from past harvest and road construction within these sub-watersheds is approximated to be 3.5% (550 ac) in Windy Creek, 3.4% (480 ac) in Fortune Branch, and 3.5% (632 ac) in Quines Creek. Under Alternative 3 productivity losses in Windy Creek HUC 6 would be approximately 0.3% for a total of about a 3.8%, in Fortune Branch HUC 6 approximately 0.5% for a total of 3.9%, and in Quines Creek HUC 6 sub-watershed about 0.02% for a total of 3.52%. Therefore under this alternative, productivity losses would not exceed 5% (RMP/EIS p. 4-13) within the Planning Area and due to BMPs and PDFs within each harvest unit.

All other effects to productivity not discussed here would be the same as those discussed under Alternative 2.

Erosion

Under Alternative 3, surface erosion would be expected to increase as a result of timber removal operations such as yarding corridors and skid trails, road construction and maintenance, timber hauling, landings reconstruction or expansions, quarry expansions, road decommissioning, one in-stream crossing and channel realignment, and one bridge replacement.

Throughout the Planning Area a total of 156 acres (0.47% of the planning area) would be prone to erosion as a result of yarding corridors and skid roads. Within Windy Creek, approximately 50 acres (0.3% of this HUC 6) of disturbance would result from yarding corridors (and skid roads) under this Action Alternative. In Fortune Branch yarding corridors would result in about 97 acres (0.7%) of disturbance, and in Quines Creek disturbance would occur on approximately 9 acres (0.05%). All disturbed land would be prone to erosion, but as discussed under Alternative 2, mitigation following harvest would be used to ensure that amount of erosion that occurs is minimized and stays primarily onsite, and that these activities do not cause Oregon water quality standards to be exceeded.

Alternative 3 would result in additional land disturbance from road maintenance, reconstruction, construction, and decommissioning, logging traffic, quarry expansions, landing reconstructions and expansions, one bridge replacement, and one stream crossing and realignment. The amount of disturbance and effects of these disturbances would be the same as those discussed under Alternative 2 with two exceptions. Under this alternative there would be 5.2 miles of temporary road construction and decommissioning, and up to 25 acres of helicopter landings would be constructed or renovated. This would increase the amount of land that would be prone to erosion, as a result of bare soil conditions or soil compaction from the above actions, by approximately 2 acres. The effects of these actions on water quality are the same as those described under Alternative 2, where it is expected that there would be a minor increase in the amount of sediment entering streams during implementation of hydrologically connected or in-stream projects such as the bridge replacement, the stream crossing and realignment, and the maintenance and use of roads that are adjacent to, or have cross-drains relief that is near, stream channels. Maintenance activities and decommissioning would be expected to reduce chronic erosion problems. Sedimentation resulting from all other upslope actions would be expected to remain primarily onsite or within upslope vegetation, and within Oregon Water Quality standards. No actions associated with this alternative would be expected to be detectable following the first wet season due to the PDFs and BMPs that would be employed during the implementation of this project.

Under this alternative, open space would be increased by approximately 882 acres as a result of harvest prescriptions that would leave canopy closures less than 30%. However, all RH/OR units located within the TSZ Windy Creek HUC 6 drainage, where baseline conditions currently exceed 25%, would be deferred, or the harvest prescription changed to maintain a minimum of 30% canopy closure. Within the Fortune Branch 0306 HUC 7 drainage harvest acres within the TSZ would occur, but remaining units have been strategically located, or their prescription has been change to maintain a minimum of 30% canopy closure, to keep open space below 25%. Since canopy closures of 30% are considered to be the minimum cover necessary to eliminate units from contributing peak flow enhancements (WPN, 1999), by changing these prescriptions and strategically deferring some units, the risk of increased peak flows that would be expected to cause in-channel erosion within several HUC 7 drainages under Alternative 2, would be eliminated. This would be expected to eliminate all measurable effects to water quality and stream habitat that may have resulted from in-stream channel erosion. This is discussed in more detail in section 3.4.2.2 Water Resources under Alternative 3.

The effects of fire hazard and fuel reduction treatments on erosion would be the same as those described under Alternative 2. Under this alternative fire hazard would increase in the short term (six months to two years) on approximately 1,671 acres due to the presence of slash in the commercial thinning units.

Mass Wasting
Mass wasting effects are the same for this alternative as those described in Alternative 2.

3.4.2 Water Resources

3.4.2.1 Affected Environment

Elevations in the Planning Area range from approximately 1,400 feet at the base of the Windy Creek HUC 6 to 5,100 feet on top of King Mountain in the headwaters of Quines Creek. The nature of the landscape within these sub-watersheds is generally steep, narrow ridges with slopes averaging between 50-70%. The transient snow zone (TSZ) in these sub-watersheds occurs from about 2500 feet on average, to the top of watershed. Precipitation within the Planning Area ranges between 35 and 60 inches per year, primarily between October and May. The Oregon Department of Environmental Quality (ODEQ) designated beneficial uses in this Planning Area include private water supplies, irrigation, industrial water supplies, livestock watering, anadromous fish passage, rearing, and spawning, resident fish and aquatic life, wildlife and hunting, boating, fishing, and water contact recreation, and hydropower.

Watershed hydrology
There are no gaging stations located within this Planning Area that would be helpful in determining the effects that past, present, or future logging may be having on peak flows, runoff timing, or water yields. Peak flows, runoff timing and water yields are the aspects of watershed hydrology that were determined during the preliminary analysis for this project (see Appendix 2) to be potentially altered as a result of this proposed project. The two known gaging stations within this Planning Area are located near the town of Azalea on

Cow Creek, and at the mouth of Windy Creek near the town of Glendale. The gaging station on Cow Creek is located in the upper portion of this planning area, where flows are highly regulated as a result of flow management on Galesville Dam. Because flow management is altering the natural watershed hydrology, this gage was determined to be of no use in assessing baseline conditions regarding these aspects of watershed hydrology for these watersheds. The gaging station in Windy was initially thought to be a useful tool for this project. However, this gage unfortunately has not been consistently maintained and therefore has many data gaps, which rendered this gage useless in terms of this analysis.

As a result of this lack of quantitative information regarding watershed hydrology, a qualitative analysis was done instead, which was based on the number of open space acres that are present within forested stands within this planning area. “Open acres” in terms of watershed hydrology in this document refers to stands that are under 30 years of age and are thus generally not fully recovered hydrologically, however, many of these acres have vegetative cover of varying types and age classes. This open space analysis was done using a satellite imagery tool called Medford Change Detection which detects open space acres within watersheds. Only forested acres that would be expected to recover, such as those acres disturbed by timber harvest or wildfire, are considered during this analysis. All “permanent openings” such as historic agricultural lands (older than 32 years), rock outcrops, and other un-forested acres are excluded from this open space analysis based on the determination that channel morphology within these watersheds would have already reached a state of dynamic equilibrium, that accounts for these conditions. The percentage of acres within each watershed that is determined to be in open space condition as a result of the disturbance which has occurred in the past 32 years (This tool does not allow for a separation of age classes at 30 years, so 32 years was used instead), is then compared to research to determine if alterations in watershed hydrology are likely. An overwhelming majority of the research on water yield augmentation resulting from open space indicates that 25% open space is a trigger point for further analysis, since this is the point at which a measurable increase in water yields can occur under certain conditions. For peak flows increases, this 25% open space trigger point is generally only of concern when these openings occur within the TSZ or where road acres exceed as little as 4% of the watershed. Road acres are generally considered to have the greatest affect on the timing of runoff, which can lead to peak flow increases. Studies show that when a watershed has anywhere from 4%-12% road acres, increases peak flows, as a result of more rapid runoff delivery, may be seen. When watersheds have less than 25% open space, impacts to hydrologic processes such as peak flows, runoff timing, and water yields are generally accepted to be undetectable. Research also indicates that watershed size is a determining factor as to the extent of these impacts on channel morphology, as is the amount of hydrologic recovery within the watershed (See Section 3.4.1 erosion for further information on hydrologic recovery). See below for research used in this analysis of past, present, and future water yield and peak flow affects within this planning area.

For this project, the analysis of past, present, and future open space and road conditions was made not only to determine if measurable changes in hydrologic processes would occur, but also whether or not those changes would result in adverse effects to beneficial uses within or below this planning area. Management objectives under this project are concerned with eliminating actions that would result in adverse affects to beneficial uses or cause water quality or Aquatic Conservation Strategy objectives to be exceeded. In watersheds where peak flows or water yields increases may occur, but would not cause adverse effects to beneficial uses such as, Essential Fish Habitat for anadromous fish, or non-compliance with the ACS objectives at the HUC 5 scale, and would not cause a violation of ODEQ water quality standards to occur, projects are considered to be in compliance with all federal regulations and the NFP. Currently the Medford RMP/EIS (Vol. 1, chapter 4-17) acknowledges that projects may result in increase in peak flows may occur in small watersheds that could degrade water quality and have a negative effect on aquatic habitat. However, the RMP includes BMPs for implementation at the site-specific project level of compaction and road building in order to limit the magnitude of those levels anticipated within the RMP/EIS.

Water Yield: Research used in Analysis

Water yield is defined as the total volume of surface runoff, measured as stream discharge, that leaves a drainage area (Church and Eaton, 2001). In a review of 94 catchment experiments worldwide, where basins ranged in size between 3 - 6,200 acres, it was been shown that deforestation causes increases in annual water yields and low summer stream flows. Increases in the average total runoff within a watershed are generally found to be in proportion with the amount of forest cover removed (Church and Eaton, 2001). Harr (1983) found that 80% of the increased water yields in the Pacific Northwest (PNW) occurred during the wet season, between October and March (Church and Eaton, 2001). However, for a 25% patch-cut (patch-cutting refers to multiple openings, of various sizes (usually 5+ acres) being created by timber harvest throughout a watershed) within a 250 acre drainage in the H.J. Andrews (HJA) experimental forest, summer water yields increased by 59%, and annual water yields increased on average by 9%. Both summer and annual water yields remained somewhat elevated for 16 years following harvest (Hicks et al. 1991). Increased water yield is primarily a result of reduced evapotranspiration and interception within the watershed, and can persist for one to two decades following harvest activity depending on the rate of vegetative recovery. Harr (1976) found that patch cutting instead of clear-cutting within a watershed, combined with riparian buffers of 50-100 feet can reduce potential increases in water yield that may be experienced due to a basin exceeding 25% open space. Harr (1976) found that the annual increases in water yield within a watershed were only 5% when patch-cutting was combined with riparian buffers. As forests regenerate, water yields generally decrease to pretreatment levels within two to three decades (Hicks et al. 1991). Another 240 acre watershed study in the HJA (Hicks et al. 1991), revealed that following initial increases that persisted for approximately 8 years, water yields fell below pretreatment levels by up to 25%, as a result of hardwoods re-establishment where conifers used to dominate. This effect is a result of higher evapotranspiration occurring with hardwood species, than with conifers in the summer months. However, this reduction in water yields would only be expected to occur where existing riparian conifers are largely eliminated allowing for increased sunlight to reach into the understory, promoting hardwood growth.

Peak Flows: Research used in Analysis

The term peak flow refers to the highest stream flow that occurs during a storm event. Impacts of timber harvest and road building on runoff timing and peak flows has resulted in widely varied results depending on the type of precipitation event (rain on snow, snow, or rain dominated), and the characteristics, size, and location of the watershed (Church and Eaton, 2001). In this planning area, steep slopes, and TSZ acres that commonly experience rain on snow storm events, are important when analyzing the effects of open space on peak flows. Watersheds are generally considered to be at risk for measurable increases in peak flows as a result of timber harvest, when open space exceeds 25% within the TSZ. Rain on snow events generally result in the largest peak flows (Harr, 1981; 1986). This risk is higher when harvest is done in conjunction with road building, or in watersheds where high road densities presently exist. As with water yields, 25% open space is not a threshold, but a trigger point at which measurable increases in peak flows may occur under the right circumstances. When this trigger point is exceeded, further analysis should be done to determine if other conditions within the watershed are such that measurable increases in peak flows are likely to occur. In larger watersheds the timing of runoff can be important in determining if peak flow increases are likely to occur in the mainstem stream. The timing of storm runoff in a 250 acre watershed in Oregon was advanced by 10 hours following 25% patch-cutting and road building that occupied 6% of the watershed (Church and Eaton, 2001).

Compaction from yarding corridors, heavy equipment, and roads reduce infiltration capacity increase subsurface water interception at cutbanks, and increase the rate of delivery of water to stream channels via ditchlines. Timber harvest additionally reduces evapotranspiration and interception of precipitation increasing the total water yield and potentially adding to flow enhancements (Harr, 1986, Jones 2000). Jones (2001) analyzed 10 small basins in Oregon and found that reductions in evapotranspiration caused by timber harvest resulted in 31%-116% increase in peak flows (Church and Eaton, 2001). Beschta et al. (2000) found that when 25-100% of timber was harvested in small watersheds (150-250 acres) peak flows increased by 13-16% above pre-harvest levels for 1 year recurrence interval events (storm events of a size that would be expected to occur every year; 1-2 year events typically alter the stream channel) and for 5 year recurrence interval events (storm events that would be expected to occur on average once every 5 years) peak flows increased between 6-9%. Six medium to large watersheds (15,320-158,146 acres) were also evaluated during this study with mixed results, with only three of the watersheds showing statistically significant results of increase in peak flows of 1-7% (Beschta et al. 2000). Harr et al. (1979) reported increases of approximately 11% after 25% patch-cutting in 125-170 acre watersheds in southwestern Oregon and northern California. A study by Wright et al. (1990) in a 1050 acre watershed located in northern California had similar findings. Jones (2001) found that the magnitude of peak flows during rain on snow events increased 25-31%. Several studies including one by Harr et al. (1982) in two small (150-175 acre) watersheds in Oregon had no measurable changes in peak flows following patch-cutting (Church and Eaton, 2001). Research shows that most measurable changes to peak flows would be in small tributary streams if changes in peak flows do occur (Bosch and Hewlett, 1982). This is because storm intensities over a large area are variable and in larger basins, and stream flows within tributaries are often out of phase when they enter the mainstem of a stream (Bosch and Hewlett, 1982), thus potentially lengthening the period of high flows, but not detectably increasing them. Another study by Duncan (1986) showed that harvesting a total of 45% of a much larger watershed (57,300 ac), 850 acres a year, continuously over a 30 year period, produced no significant changes in peak flows (Harr, 1989). 850 acres of harvest per year would have resulted in 30% of the watershed being harvested by year 20 with no acres considered to be in an advanced stage of hydrologic recovery, and 45% of the watershed in open space condition by year 30 with only 15% of these acres considered to be in advanced stage of hydrologic recovery.

Watersheds with high road densities have been shown to have larger increases in peak flows. Ziemer (1981) found that roads can modify peak flows by reducing infiltration on compacted surfaces, allowing for more rapid surface runoff, or by intercepting subsurface and surface runoff, and channeling it more directly into streams. In a study conducted in the HJA timing and average peak flows where affected by forest harvest and road building. In this study, road building that covered 6% of the 250 acre watershed increased peak flows by up to 20% and caused the storm hydrograph to advance by 10 hours. Four years later this same watershed was patch-cut totaling 25% of the watershed, and a much greater increase was seen in the peak flows than what research has shown to occur with timber harvest or road building alone. For the first 5 years following harvest in this watershed the average peak flow increased by 50%, equivalent to that of a 100% clearcut watershed without roads. Peak flows and increased rates of water delivery to the stream were still persistent 25 years following the treatment, with peak flows still 25% larger on average (Church and Eaton, 2001).

<u>Affected Environment</u>
Since research indicates that roads are the most critical impact to a watershed in regards to hydrology and peak flow changes, an assessment was done to evaluate the risk of hydrologic changes resulting from roads individually. The analysis completed revealed that roads currently occupy 1.5% of the acres within the Windy Creek HUC 6 sub-watershed, 2% within the Fortune Branch HUC 6, and 2% within the Quines Creek HUC 6 sub-watershed. According to a studies by Bowling and Lettenmaier (1997), Harr et al. (1975) and others, measurable increases in peak flows from road acreages alone, are not seen until roads occupy at least 3-4% of the acres within small (175-750 acres) watersheds (WPN, 1999). Harr et al. found in one study that 12% is necessary for measurable increases (WPN, 1999).

As discussed under section 3.4.1.1 erosion, the Windy Creek HUC 6 was further analyzed for potential peak flow enhancements, as a result of current open space conditions in excess of 25%. It was determined that this sub-watershed was not at risk for measurable peak flow enhancements at the HUC 6 level (section 3.4.1.1). Fortune Branch and Quines Creek sub-watersheds both have only 2% percentage of road acres, not extensive enough to result in measurable peak flow increases, and less than 25% open space both within the entire HUC 6 sub-watershed and within the TSZ. Therefore it is not likely that these sub-watersheds are experiencing measurable peak flow increases at the HUC 6 scale as a result of past disturbance. Several HUC 7 drainages were investigated more closely for potential peak flow and water yield enhancements (Windy Creek 0409, 0418, and 0421 and Fortune

Branch 0309, 0318, 0324, 0327) which may be occurring as a result of the number of acres presently in open space condition.

Windy Creek HUC 6

Within the TSZ, rain-on-snow events can accelerate snow melt in forest openings, further increasing the rate of delivery and enhancement of peak flows within a watershed. On a HUC 6 or larger scale, this Planning Area would presently be at a low risk of peak flow enhancement solely as a result of TSZ openings based on the amount of open acres that are within the TSZ and the percentage of TSZ acres within each of these sub-watersheds (WPN, 1999). However, there are three HUC 7 drainages within the Windy Creek HUC 6 sub-watershed (0409, 0418, and 0421) where the maximum amount of open area currently existing within the TSZ exceeds 25%.

The Windy 0409 HUC 7 drainage is presently about 37% open space in the TSZ, and the TSZ accounts for about 33% of the total acres within this drainage. However, based on field observations, there are currently no signs of increased channel scour on BLM land below the headwaters of the most highly impacted areas within this HUC 7 drainage. The 0409 HUC 7 drainage has about 20% open space overall, with a road density of approximately 2.4mi/mi^2 (or 1% of the watershed's acres), there has been little disturbance between where the TSZ open space is located and the streams that are located below these openings. As a result, it would be expected that most of the additional flow generated as a result of TSZ openings is being reabsorbed into the vegetated landscape below, and is not resulting in increased peak flows or sedimentation within stream channels. Since there are no mapped intermittent or perennial streams within any of these disturbed acres, and based on field observations, the riparian zones located along the streams that occur below these TSZ openings are generally in good condition with larger trees and established streamside vegetation in the headwater tributaries there would be little chance that stream bank scour is occurring as a result of any increased flows within this sub-watershed.

Within the Windy Creek 0421 and 0418 drainages, open space within the TSZ is likely causing a measurable increase in peak flows, and riparian areas in many locations are in poor condition, primarily from past timber harvest activities on non-federal lands, and existing roads. Within the 0421 drainage, about 13% of this HUC 7 is located within the TSZ, with over 60% of the TSZ acres presently in open space condition. The drainage as a whole has approximately 30% open space. Nearly all the TSZ in the HUC 7 is located at the headwaters of Deeds Creek. It would therefore be expected that the moderate channel scour that was observed during field visits to the upper tributaries of the Deeds Creek drainage is a result of increased peak flows and water yields occurring within this watershed. Because of larger channel size and the reduced gradient of the mainstem of Windy Creek, which is located nearly a mile downstream of where these scoured headwater streams enter Deeds Creek, the limited contributing area of Deeds Creek HUC 7 drainage (17%), and because the soils within this drainage are moderately cohesive, any impacts, that are presently occurring as a result of increased peak flows from past disturbance within this drainage, would not be expected to be causing measurable impacts to the channel structure, water quality, or coho habitat within the mainstem of Windy Creek at the mouth of this drainage.

Wood Creek, the main stream within the 0418 HUC drainage is a 303(d) stream, listed for temperature and habitat modification. Wood Creek also provides habitat for coho salmon from the mouth to the junction of the headwater tributaries. Surveys indicate that the amount of fine substrate within this stream is more than double the levels that begin to cause adverse effects to aquatic species. Additionally, streams listed for habitat modification do not meet the requirements for LWD and pool frequency criteria indicative of a stable, well functioning stream in these drainages. Several recent private timber sales in this drainage have impacted riparian zones and fish habitat conditions along Wood Creek and its tributaries. The 0418 HUC 7 drainage currently has 46% of its acres located within the TSZ, approximately 50% of which are currently open space. Additionally, this HUC 7 drainage has had a considerable amount of acres harvested outside the TSZ, with approximately 53% of it in open space condition. Though approximately 10% of these total acres, and 33% of the acres within the TSZ of this HUC 7 are in, or nearing, an advanced stage of hydrologic recovery (20-30 years old), it would still be expected that open space conditions in this drainage are presently contributing to a measurable increase in peak flows and water yields. Additionally, as a result of the combined effects of the drainage condition as a whole, the percentage of the drainage that is in the TSZ, the amount acres within the TSZ that are in open condition, and the degraded condition of the riparian zones along many of these streams, it would be expected that this HUC 7 drainage is currently experiencing widespread impacts as a result of increased water yields and peak flows. This is likely the one source of the sediment problem within Wood Creek, and would expect to remain so until vegetation recovers or the stream channel adjusts to accommodate these higher flows. Stream bank erosion at the HUC 6 scale within Windy Creek below the Wood Creek confluence is not apparent. This is likely a result of the much larger channel capacity of Windy Creek, and because this HUC 7 drainage only accounts for about 25% of Windy Creek's total contributing drainage area. It was also determined, based on the large amount of fine sediments that were found during surveys of Wood Creek, that the increased sediment entering the stream as a result of the current watershed condition is likely being deposited within the debris and other channel structures throughout Wood Creek, and is intermittently becoming suspended and transported through the system during periods of high flow. Since there is approximately 1.7 miles between where these affected headwaters enter Wood Creek, and the confluence of Wood Creek and Windy Creek, and due to the apparent ability of Wood Creek to trap and store sediment and release it during higher flow events in lower quantity pulses, it would be unlikely that the sediment in Wood Creek is causing a measurable increase in sediment loads within Windy Creek, especially given the small contributing drainage area of this HUC 7 drainage. As such, it does not appear that these HUC 7 level effects are currently resulting in a measurable impact to beneficial uses at the HUC 6 level.

<u>Fortune Branch HUC 6</u>
Within the Fortune Branch HUC 6 sub-watershed the 0309, 0318, 0324, and 0327 HUC 7 drainages currently exceed the 25% open space condition that research has shown may potentially increase peak flows and water yields within small drainages comparable to these. As such these drainages were further analyzed to determine whether measurable increases were likely occurring.

The 0309 drainage is not likely experiencing measurable increases in peak flows, or ensuing channel scour, despite having open space in excess of 40%, because there are no TSZ acres within this drainage that would lead to rain on snow events. Research indicates that peak flow increases are associated with the amount of open space within the TSZ, though the magnitude of these flows can be increased due to roads, and reduced evapotranspiration resulting from the removal of vegetation. This drainage is a small (395 acres), low elevation drainage, with a relatively low slopes and deep soils.. It would be expected that presently most rainfall is being infiltrated into the deep soils that exist throughout much of this drainage, with undetectable increases in the amount of surface runoff. Water yields, however, are likely being augmented in this drainage as a result of these conditions. The magnitude of the water yield increase however would be expected to be largely diminished at present due to hydrologic recovery that has occurred within this drainage. Increased water yields resulting from the removal of vegetation, generally last between 10-20 years. Currently, 47% of these the open space acres (75 acres) within this HUC 7 drainage are 16 years or older, nearing a point where water yield increases would be immeasurable.

The 0318 drainage has both 42% open space throughout the basin, and 26% open space within the TSZ. This drainage has multiple tributaries adjacent to a large area of open space which, based on field observations, currently appear to have slightly incised channel morphology that is likely at least partially a result of the amount of open space within the TSZ and this drainage as a whole. These effects appear to be localized and discontinuous within the tributary streams where they are occurring with no visible effects present within the main HUC 7 stream channel downstream. In addition to potentially augmenting the peak flow increases to the point of measurable, the annual water yield increases that are expected to be occurring as a result of the 42% open space within the basin would also increase baseflows both in the winter and summer months. This would be expected to have a neutral or positive effect on beneficial uses in the summer months due to increased water storage, and slightly higher stream flows. Channel morphology would not be altered by baseflows, and thus increased water yield, would also not be expected to have a negetive effect to aquatic habitat during the winter or summer months, at any watershed scale. Research shows that winter flows could be increased by up to 10%. This drainage accounts for less than 10% of the contributing area of the Fortune Branch HUC 6 sub-watershed.

The 0324 and 0327 drainages have 30% and 28% open space respectively, and both have less than 4.5% of the watershed acres occurring within the TSZ, with less than 3.5 acres of TSZ disturbance. These drainages therefore may be presently be experiencing some minor water yield enhancements based on research, however due to the limited TSZ acres it would be expected that any peak flow and water yield increases that are presently occurring as a result of past harvest open space conditions, would be negligible. And therefore it would not be expected that these watersheds would currently be experiencing any channel scour as a result of past harvest activities.

Table 3 - 10. Open Space Disturbance by sub-watershed (including harvest and roads) [5]

Windy Creek	Acres (%) of Basin in Open Space	Total Basin Acres/ % of HUC 6	Acres (%) of TSZ in Open Space	Acres (%) of Watershed Acres located in the TSZ	% of Total HUC 6 TSZ Acres
HUC 6- 171003020704	4395 (28%)	15700 (100%)	1785 (36%)	4985 (32%)	100%
HUC 7- 17100302070403	785 (15%)	5240 (33%)	375 (22%)	1740 (33%)	35%
HUC 7- 17100302070406	160 (14%)	1180 (8%)	40 (10%)	390 (33%)	8%
HUC 7- 17100302070409	325 (20%)	1610 (10%)	195 (37%)	525 (33%)	11%
HUC 7- 17100302070412	8 (7%)	115 (1%)	0 (0%)	0 (0%)	0%
HUC 7- 17100302070415	80 (13%)	650 (4%)	0 (0%)	30 (5%)	<1%
HUC 7- 17100302070418	2250 (53%)	4250 (27%)	970 (49%)	1960 (46%)	39%
HUC 7- 17100302070421	785 (30%)	2650 (17%)	205 (61%)	337 (13%)	7%
Fortune Branch					
HUC 6- 171003020703	3245 (23%)	13870 (100%)	445 (20%)	2260 (16%)	100%
HUC 7- 17100302070303	100 (22%)	450 (3%)	0 (0%)	0 (0%)	0%
HUC 7- 17100302070306	665 (23%)	2930 (21%)	200 (16%)	1225 (42%)	54%
HUC 7- 17100302070309	160 (41%)	395 (3%)	0 (0%)	0 (0%)	0%
HUC 7- 17100302070312	605 (24%)	2480 (18%)	165 (22%)	735 (30%)	33%
HUC 7- 17100302070315	205 (14%)	1510 (11%)	2 (4%)	55 (4%)	2%
HUC 7- 17100302070318	520 (42%)	1250 (9%)	20 (25%)	80 (6%)	4%
HUC 7- 17100302070321	500 (16%)	3225 (24%)	10 (9%)	107 (3%)	5%
HUC 7- 17100302070324	385 (30%)	1290 (9%)	5 (9%)	56 (4%)	2%
HUC 7- 17100302070327	95 (29%)	330 (2%)	0 (0%)	0 (0%)	0%
Quines Creek*					
HUC 6- 171003020702	4005 (22%)	18140 (100%)	1390 (21%)	6475 (36%)	100%
HUC 7- 17100302070203	1190 (22%)	5490 (30%)	145 (15%)	988 (18%)	15%
HUC 7- 17100302070227	430 (19%)	2210 (12%)	40 (50%)	80 (4%)	1%

Beneficial uses that could currently be locally affected, at the HUC 7 level or less, as a result of peak flow and water yield increases from past disturbance are anadromous fish rearing and spawning, and resident fish and other aquatic life. Localized increases in peak flows may be resulting in localized stream bed and bank erosion, and subsequent increases in sedimentation, changes in channel morphology, and a loss of channel substrate and woody debris. The effects of these alterations on fish and fish habitat are discussed within the fisheries section (3.4.3.1). In all but the lower valley bottoms, streams in this Planning Area are generally constrained bedrock, pool drop, or cascade systems with large boulders and woody debris providing a majority of the channel structure. Stream surveys indicate that within these streams, LWD is often deficient and thus localized channel structure and stability is currently at risk. This reduces the ability of the stream to dissipate energy, leading to potential degradation of the channel with increased flow.

Sedimentation and Turbidity

Where they are hydrologically connected to streams, all sources of upland erosion, discussed in the soils section, are causing sedimentation within streams to be above natural levels in this Planning Area. Additionally, open space conditions within the Windy Creek 0418 and 0421, and the Fortune Branch 0318 HUC 7 drainages are thought to be causing measurable localized increases in peak flows that may be altering the channel morphology by flushing smaller substrate and scouring the channel bed and banks, leading to increased sedimentation.

Windy Creek sub-watershed currently has a road density of 4.27 mi/mi^2. Fortune Branch and Quines Creek have road densities of 5.12 mi/mi^2 and 5.01 mi/mi^2 respectively. The USFS, NMFS, and others collaboratively created list of factors and trigger points for assessing watershed health (NOAA Fisheries, 2004). It identifies watersheds to be properly functioning when road densities remain below 2.0 mi/mi^2 and not properly functioning at 3.0 mi/mi^2. Currently about 50% of the streams in this watershed are within one tree length of roads. Over 50% of the roads within the Windy Creek HUC 6, approximately 34% of the Fortune Branch HUC 6, and about 37% of the Quines Creek HUC 6 are native surface. Many of the roads in this Planning Area are in need of resurfacing or drainage improvement. Un-maintained and poorly maintained roads, and native surface roads used for winter haul, are the largest ongoing sediment sources in these HUC 6 watersheds within this Planning Area (Middle Cow Creek WA, 1999).

Studies have shown that roads can contribute 50-80% of the sediment that enters streams (Hagans et al., 1986). Un-vegetated ditchlines, road surfaces, and cross drains all mobilize soils which can enter streams. Roads also modify hydrology both through interception of precipitation on the road surface, and through interception of subsurface flow (Wemple and Jones, 2003 [Megahan and Clayton, 1983]). Channelization of this flow in ditchlines and cross drains, has led to gully formation and slumping in some hillslopes within this watershed. Roads, due to their connectedness with the stream network, and clear-cuts which are located adjacent to streams, are contributing sediment to streams within this Planning Area. Based on habitat surveys, sediment in some stream reaches of Windy Creek, Wood Creek, Bear Creek, Lawson Creek, and Fortune Branch within this Planning Area is more than double NMFS' recommended levels for properly functioning conditions for aquatic habitat (see Section 3.4.3.1 Fisheries).

3.4.2.2 Environmental Effects

Alternative 1 (No Action)

<u>Watershed Hydrology</u>
There would be no change in water yield, peak flows, low flows, or timing of water delivery to stream channels as a result of Alternative 1. Watersheds currently impacted by past timber harvest and fire would slowly continue to improve hydrologically on federal lands until other timber management actions were analyzed and approved. It would be expected that this Planning Area would continue to be altered hydrologically by timber harvest on non-federal lands that would continue to remove canopy cover, regardless of the selected alternative. Currently the ODF New Notifications and Renewals (Dec, 2005) repots that approximately 850 acres are proposed for clearcut harvest in this Planning Area, independently of this project. Past trends indicate that approximately 300 acres of forest canopy has been removed per year on non-federal land within this Planning Area. This trend would be expected to continue regardless of which alternative is chosen for this project. Mature stands would not be removed on federal lands under this alternative, eliminating the short term increase in slash fuel loading, and the establishment of less fire resistant young plantations; however there would also be no reduction in fuel loading

within WUI areas as a result of Alternative 1. Many portions of the Planning Area would continue to be at risk for severe fire activity due to heavy fuel. Open space created by wildfire in some HUC 7 drainages could lead to peak flow enhancement and changes in watershed hydrology. Road construction would also be expected to continue on non-federal lands that would increase road densities within this watershed. Since roads increase the number of compacted areas reducing infiltration, have been found to intercept surface and subsurface flows, and increase the rate of water delivery to streams, non-federal road construction would be expected to increase peak flows within some watersheds within this Planning Area where baseline conditions are currently nearing 3-4% road acres, or potentially in HUC 7 drainages that have open space conditions in excess of 25% in the TSZ (see peak flow research above).

<u>Sedimentation and Turbidity</u>
Sediment inputs to streams would not be altered as a result of Alternative 1. Under the No Action Alternative there would be no projects that would result in a short-term increase in sedimentation, or any projects that would result in a long-term reduction in sediment that would be beneficial to water quality and aquatic species within the watershed. Some poorly maintained and native surface roads which are used by non-federal logging operations and the general public would continue to cause chronic stream sedimentation, especially where these roads are hydrologically connected to the stream channel. No road decommissioning or road maintenance would occur under Alternative 3. Existing drainage problems on non-federal lands would remain, and on federally controlled roads that are not scheduled for maintenance, problems would only be resolved as emergencies occur, or additional funding is available. Where these roads are hydrologically connected to streams, or where slumps and slides occur as a result, this would be expected to further increase sediment loads in streams within this planning area.

Thus LWD needed for channel structure and stability, and aquatic habitat would continue to develop at a reduced rate under crowded stand conditions. Wildfire hazard would not be reduced within this Planning Area in the long term as a result of this alternative. Within the riparian zones, severe fire activity that is associated with heavy fuel loads, and dry weather burning conditions would increase the chance of sediment entering the streams from dry ravel and rill erosion

Alternative 2 (Proposed Action)

<u>Watershed Hydrology</u>
Alternative 2 proposes increasing open space within this Planning Area by approximately 1,440 acres (3.9% of the planning area) as a result of timber removal, quarry expansions, and the construction of roads and landings. In the Windy Creek HUC 6 sub-watershed, approximately 606 acres are proposed for timber harvest activities that would create open space. Additionally, 2 quarry expansions totaling up to 10 acres, 10 acres of potential helicopter landings, 7 acres of temporary and permanent road, discussed above, would create open space. Under this alternative open space would be increased by approximately 4% within the Windy Creek HUC 6, increasing it to about 32%. Harvesting is being proposed in Fortune Branch that would increase open space on about 652 acres, and to

access these acres 9 acres of temporary and 1.5 acres of permanent road would be built. In addition, 2 quarry expansions totaling 15 acres and up to 8 acres of helicopter landings would cause approximately 23 acres of new open space. Together this would increase open space within the Fortune Branch HUC 6 by about 5.0%, for a total of 28% open space within this sub-watershed. The Quines Creek HUC 6 has approximately 119 acres of harvest proposed under Alternative 2 that would create open space. In addition 0.2 acres of temporary roads and up to 2 acres of helicopter landings are proposed in this sub-watershed. This would increase open space in this sub-watershed by about 1%, for a total of approximately 23% open space.

A majority of the roads proposed in Alternative 2 would be temporary spurs, with the only permanent road being 0.49 miles of ridgeline road that would connect existing roads along the ridge between Fortune Branch and Windy Creek HUC 6 sub-watersheds. Research indicates that ridgeline roads, when outsloped, or designed with adequate cross drains, have minimal impact on watershed hydrology because they do not intercept large quantities of subsurface flow, and do not excessively concentrate and redirect intercepted surface flows. New temporary roads are proposed for access to some harvest units, which would otherwise need very long yarding corridors, or be left untreated. In general, these roads would be fully decommissioned, stabilized, and planted the within the same dry season that they are built. Where this is not possible due to timber harvest requirements, these roads would be stabilized, and water-barred to ensure proper drainage during the winter months. Therefore it would not be expected that these roads to have a lasting effect on watershed hydrology. There is also one bridge that would need to be replaced over Windy Creek, for safety reasons. Replacement of this bridge would not affect watershed hydrology or change existing channel conditions because the existing structure is not constricting or altering the stream channel, and replacing this structure does not require any in channel work.

For the Fortune Branch HUC 6 and Windy Creek HUC 6 sub-watersheds, Alternative 2 would increase open space to approximately 28% and 32% respectively, raising them above the 25% trigger point where further analysis of potential peak flows and water yields is necessary. However, these are HUC 6 sub-watersheds, ranging between 13,800-18,200 acres, and studies have shown that peak flow increases are generally of a lesser magnitude, or completely undetectable, when harvest levels such as these occur within these larger basins (Church and Eaton, 2001). As discussed in the peak flows research previously, most measurable changes would be in small tributary streams if changes in peak flows do occur (Bosch and Hewlett, 1982). This is because storm intensities over a large area are variable and in larger basins, and stream flows within tributaries are often out of phase when they enter the mainstem of a stream (Bosch and Hewlett, 1982), thus potentially lengthening the period of high flows, but not detectably increasing them. Duncan (1986) showed that harvesting a total of 45% of a much larger watershed (57,300 ac), 850 acres a year, continuously over a 30 year period, produced no significant changes in peak flows (Harr, 1989). Additionally, these sub-watersheds have a relatively low percentage of existing road acres. Research indicates that roads are the most critical impact to a watershed in regards to hydrology and peak flow changes (See section 3.4.2). The addition of 10 acres of road in Fortune Branch HUC 6, and 6 acres in Windy Creek, would still keep road acres in these sub-watersheds well below the 3-4% (of the watersheds total acres) where measurable increases in peak flows may be seen (Bowling and Lettenmaier, 1997). As a result it would be unlikely that any measurable increase or decrease in flows, water yields, or hydrologic timing would be seen as a result of this project within the large streams in these sub-watersheds.

The Quines Creek HUC 6 sub-watershed would remain under 25% open space under Alternative 2, and road acres would continue to be relatively low. Therefore it would be unlikely, when comparing these impacts to experiments in the HJ Andrews, Casper Creek, and others (Church and Eaton, 2001), that there would be any considerable changes, on a HUC 6 scale, in the peak flows, water yield, low flows, or hydrologic timing within the Quines Creek HUC 6 sub-watershed, as a result of Alternative 2. Both HUC 7 basins that are included within this Planning Area would also remain below 25% open space and only 0.2 acres of additional roads are proposed. As a result it would not be expected that any hydrologic changes would occur at the HUC 7 scale within the Quines Creek sub-watershed either.

Alternative 2 proposes increasing open space within the TSZ of the Fortune Branch HUC 6 by approximately 9% as a result of logging and road building activities. Harvest units that would create open space within the TSZ are being proposed in Fortune Branch on 200 acres, and to access these acres an additional 2.4 miles of temporary roads would be built. Increasing open space within the TSZ of this HUC 6 to approximately 29%, of which 2.6% would be roads. Within Windy Creek HUC 6 approximately 300 acres are proposed for RH/OR harvest that would increase the open space within the TSZ by about 6%. About 2 miles of roads built to access these acres, increasing open space in the TSZ to nearly 42%. Roads alone would total 1.9% of the TSZ of this HUC 6. In Quines Creek HUC 6, 90 acres of harvest would increase open space by 1.4%, for a total of about 24% open space in TSZ of this HUC 6. Roads would still occupy approximately 1.5% of the TSZ within this sub-watershed. Because the TSZ only accounts for 16% in Fortune Branch, 32% in Windy Creek, and 36% in Quines Creek HUC 6 sub-watersheds, the amount of open space within the TSZ in these sub-watersheds would not be expected to increase peak flows at the HUC 6 scale, as all watersheds fall within the low risk of peak flow enhancement category of the Watershed Professionals Network (1999) graph. This graph identifies risk classes for forestry related impacts during rain on snow events based on percentage of total TSZ acres that occur within a HUC 6 watershed, and what percentage of those acres have less than 30% canopy closure (Chapter IV-11). The low risk category represents potential peak flow increases that would be immeasurable due to their magnitude. However, within these HUC 6 sub-watersheds, five HUC 7 drainages (0306, 0324, 0409, 0418, and 0421) could experience localized effects as a result of TSZ harvest under Alternative 2.

In the Windy Creek 0409 HUC 7 TSZ, there are about 30 acres proposed for harvest prescriptions that would result in canopy closures less than 30%. This would increase open space within this HUC 7 TSZ from about 36% open space to about 41% open space. Approximately 33% of this drainage is within the TSZ and the drainage as a whole would remain under 25% open condition. As a result, it would be expected that if the openings caused by this harvest did result in any increases in peak flows, and those peak flows cause any stream channel bed or bank erosion, the effects would be localized within the two tributaries downslope of where these past and current open space conditions in this drainage would be situated, and upper reaches of Lawson Creek. Any impacts to the stream channel, from any peak flows increases that do occur, would be localized because this watershed has only 33% of its acres located within the TSZ, approximately 11% of the 41% of the harvested open space acres within the TSZ are currently at, or approaching an advanced stage of hydrologic recovery, lessening the effects of this open space, and the remaining 67% of the watershed outside the TSZ is hydrologically in good condition with less than 23% total open space for all acres within the HUC 7. Additionally, because the magnitude of any potential peak flow increases within the two tributaries that may be affected, would be small, and because these two tributaries are located approximately 1 mile downstream of the upper reaches of Lawson Creek where the stream flow is much higher, it would not be expected that any peak flow increases that may occur within the only non-tributary stream within this watershed, Lawson Creek, would be measurable.

Riparian baseline conditions, described in the Affected Environment are not properly functioning in both the Windy Creek 0418 and 0421 HUC 7 basins. These basins would be further affected as a result of this alternative. Within the 0421 HUC 7 drainage 240 acres of RH/OR are being proposed under Alternative 2. Of these, approximately 100 acres would be harvested in the TSZ. As a result, open space within this drainage would increased to 90% within the TSZ, and to 39% overall. This is a very small TSZ at 337 acres (13% of this HUC 7), however because these acres are concentrated above the headwaters of Deeds Creek, this action would be expected to further impact the already degraded channel conditions within the headwater streams of Deeds Creek. Annual water yields would also be expected to be measurably augmented within the tributary streams due to the 39% open space condition within this drainage. This would be expected to have a neutral or beneficial effect to aquatics during summer months when low flow conditions generally result in above optimal water temperatures. Water yield increases in the summer or winter months would not be expected to alter channel morphology as only baseline flow increases are generally measurable. Any increase in water yields would not be measurable within the larger mainstem streams due to the small drainage area and minimal increased volume of stream flow that would result. Within the 0418 drainage, Alternative 2 proposes about 300 acres of RH/OR, approximately 100 acres of which would occur within the TSZ. This would increase open space in this drainage to about 60%, and open space within the TSZ to about 55%. As discussed above this drainage presently has a degraded baseline condition that is likely already affecting the watershed hydrology, stream channel, and water quality within Wood Creek and its tributaries. Over 2/3 of the acres in the Windy Creek HUC 6 that are proposed for RH/OR harvest under this alternative, would occur in the lower portion of this sub-watershed within these two HUC 7 basins (0418 and 0421). The existing condition of these two drainages, and the amount of open space within these TSZ's, increases the potential that additional impacts would cause measurable effects to the channel structure and sediment loads within these Windy Creek tributaries. Additional activity within either the 0421 or 0418 HUC 7 drainages would contribute to, and potentially increase, the impacts that are presently occurring in these stream channels. It would be expected that this would lengthen the recovery time for physical processes, and increase the impacts to aquatic organisms and coho salmon (discussed within fisheries section 3.4.3). However, because 56% of the acreage contributing to the flows in Windy

Creek occurs above the junction of these drainages, and because research shows that measurable increases in peak flows generally occur within small tributary streams (Bosch and Hewlett, 1982) and that tributaries storm flows are often out of phase when entering the mainstem (Bosch and Hewlett, 1982) lengthening high flows but decreasing the effects, it would be expected that any increased stream energy or sediment loads within these tributaries would be diluted to the point of being negligible upon entering the mainstem of Windy Creek. Therefore, it would not be expected that any activity associated with this project would cause a measurable difference in the timing or magnitude of the peak flows, or by extension, in the quantity of ground water storage at the HUC 6 scale. Anticipated water yield enhancements resulting from the removal of vegetation in this drainage would be expected to be the same as those discussed above for the 0421 drainage.

Within Fortune Branch HUC 6, it would be expected that any detectable peak flow increases resulting from Alternative 2 would be within the 0306 and 0324 HUC 7 drainages where open space would be increased by 13% and 7% respectively. The 0306 drainage is approximately 42% TSZ. Under this alternative, 374 acres are proposed for harvest within this drainage, 168 of these acres are within the TSZ. This would increase the open space within this HUC 7 to about 31% in the TSZ and 30% overall. Because both the TSZ and drainage as a whole exceed the recommended 25% of open space, Alternative 2 could potentially increase the risk of minor localized peak flow and water yield enhancements within this HUC 7. However, approximately 24% of the HUC 7 acres and 31% of the TSZ acres within this HUC 7 are in, or nearing, an advanced stage of hydrologic recovery. This would likely be reducing the magnitude of any baseline open space peak flow increases because a moderate percentage of the evapotranspiration and interception process would be occurring within stands that are in an advanced stage of hydrologic recovery. As the magnitudes of the peak flow effects are reduced, so is their effect on the stream channel. It also means that without further reductions in canopy closure when this drainage, the time of recovery to the point where hydrologic changes would be immeasurable again (less than 25% of the drainage younger than 30 years of age) would be approximately 8 years, based on the age of the remaining stands. Due to the relatively low magnitude of the flow enhancements that would be expected within this sub-watershed due to open space percentages, hydrologic recovery, existing streambank conditions, and amount of road acres, any channel scour that may occur as a result of increased peak flows caused by Alternative 2 activities in this sub-drainage would be expected to be highly localized and it would not be expected that there would be enough channel erosion to result in any measurable impacts at the HUC 6 level to fish habitat within the mainstem of Fortune Branch due to its large channel capacity, and the relative size of the flow enhancement. Increased water yields would also be expected to be measurable only at the HUC 7 level due to the magnitude of the effects.

In the 0324 drainage, open space would be increased from about 30% to approximately 36%. Open space would also be increased within the TSZ to approximately 30%. However, because this drainage only has 4.5% of its acres within the TSZ and these acres are dispersed along the upper ridgeline of this HUC 7 drainage, meaning that any effects would be dispersed into several tributary streams, reducing the effect to any one stream, open space within this TSZ not be expected to result in any measurable changes in peak flows.

However, because most of the open space acres within this drainage are less than 15 years old, and thus not considered to be in an advanced stage of hydrologic recovery, it would be expected that increased open space within this drainage would lead to measurable localized increases in water yields within several tributaries due to reduced evapotranspiration and infiltration. This condition would be expected to be minor, and would not be expect to alter the stream channel or cause any scour that would lead to sedimentation.

In the 0318 drainage, open space would be increased by less than 1% (11 acres) to 43% under Alternative 2. Though there is currently over 25% open space within the TSZ and 42% open space within the drainage, the small size of this unit, the use of 185 foot stream buffers which would help to slow surface water and allow it to infiltrate back into the soil, and the units' location within a section of federal lands with little pre-existing impact, it would be expected that this action would not cause a measurable increase in peak flows or water yields within this HUC 7 drainage The 0312 drainage would also be above 25% open space as a result of this alternative. TSZ openings however would remain below the 25% trigger point for potential peak flow increases. 53 acres (2%) of RH/OR harvest that would reduce canopy closure below 30% are proposed in this HUC 7 increasing open space to 27%. When hydrologic recovery is taken into account (34% in an advanced stage of recovery) with the fact that this drainage is only 2% above the potentially detectable 25% level, it would not be expected that any measurable increases peak flows or water yields would be seen in this drainage

Sedimentation and Turbidity

Studies have shown that "the predominant factors which influence the relationship between on-site erosion and sediment delivery (to the streams) are slope and width of effective buffer strip to trap sediment" (Amaranthus, 1981). By using the Ecological Protection Width Needs Chart (B-15 of the RMP ROD) and limiting the amount of exposed and compacted soils in each unit, the eroded material that enters the streams is considerably reduced. The Ecological Protection Width Needs Chart takes into consideration riparian processes such as "streamside erosion, fluvial erosion of the stream channel, soil productivity, habitat for riparian dependant species, the ability of streams to transmit damage downstream, and the role of streams in the distribution of large wood to downstream fish-bearing waters". Effects such as peak flows, channel scour, and stream sedimentation, which could all potentially affect aquatic habitat under this project at the HUC 7 scale, would meet all water quality objectives at the HUC 6 scale. Since when effects are present, they are more apparent at the smaller HUC 6 scale than at the HUC 5 scale, and since measurable effects at the HUC 6 scale are not expected occur as a result of this project, it can therefore be presumed that the effects from this project would be within the ACS objectives at the HUC 5 level. ACS objectives are designed to maintain and improve aquatic habitat in the long-term at the HUC 5 scale. Additional protection would be applied to riparian reserves adjacent to RH/OR units, in order to ensure protection and movement of species through use of the riparian reserve areas.

Small amounts of additional sediment would be mobilized to streams during the first winter season as a result of the increased upslope erosion activities that would be dispersed over the Planning Area and would result in sedimentation within streams in 16 different HUC 7 drainages. Activities that would result in surface erosion that could potentially be routed to streams are discussed under section 3.4.1.2, Alternative 2, Erosion. The Medford District RMP/EIS contains a list of BMPs designed to both reduce the amount of soil displaced and the amount of sediment that enters the streams as a result of timber harvest, road use, construction, decommissioning, and maintenance, prescribed fire, and others (Vol 2, pp.31). These activities would not be expected to cause enough sediment to enter any one stream for ODEQ water quality standards to be exceeded due to how dispersed the proposed acres are, and because PDFs and BMPs would be in place that are designed to limit the amount of erosion and subsequent sedimentation, and to keep upslope erosion predominately onsite (see Section 2.3 Project Design Features). Currently this standard is based on the turbidity within a stream. A complete description of this standard is available at www.epa.gov/waterscience/criteria/sediment/appendix3.pdf ,but effectively states that cumulative increases in turbidity below the project cannot exceed baseline stream turbidities by more than ten percent, as measured by a control point immediately upstream of a project.

One pre-existing chronic sediment source for Fortune Branch Creek is .2 miles of severely deteriorating road. Under Alternative 2, this road would be fully decommissioned, which would be expected to eliminate all measurable sediment from this source in the future. Decommissioning of an additional 0.54 miles of road would further reduce sedimentation, delivered via ditchlines and road surface erosion, by increasing infiltration through sub-soiling, dispersing surface flow with waterbars, and increasing vegetative cover on these acres. Road maintenance and reconstruction would also reduce chronic sedimentation in the long term by improving surface drainage, rocking or spot rocking native surface and deteriorating roads, and by replacing and upgrading cross drains and draw culverts. There could be up to 9 draw culverts replaced under this alternative that are within ¼ mile of coho habitat. Because this would require in stream work, it would be expected that there would be a localized, short term increase in sediment within Essential Fish Habitat during the installation of these culverts. However due to PDFs such as the use of geotextile fabric or coconut fiber logs/bales would be placed below the work area, diverting flowing water around the work site, and removing excess sediment upon completion of the installation, the amount of additional sediment remaining in the channel should be minimal, and would be expected to be immeasurable at the site following the first winter.

As discussed above under watershed hydrology, increased open space within some HUC 7s could potentially increase peak flows resulting in localized areas of channel instability and an increase in the amount of sediment originating from these headwater streams. Within the 0306, 0324, 0409, 0418, and 0421 drainages, channel scour could potentially result in increased sediment and turbidity within these streams during and immediately following storm flow events. Bank destabilization can result in a short or long term increase in sediment loads, and under some circumstances would modify channel morphology and discontinuous localized aquatic habitat. Downstream, where flow energy is reduced, due to gradient or channel characteristics, excessive fine sediment becomes trapped within the interstitial spaces of the stream substrate sediment, resulting in effects to fish and other aquatic organisms. These effects would be further discussed in 3.4.3.2 Fisheries. As a result of the increase in peak flows that would likely occur under Alternative 2, it would be expected that high turbidities would be seen, and the deposition of fine sediments would occur at the HUC 7 scale within some tributary streams of Windy Creek and Fortune Branch during the first winter, and during high flows events for an indefinite period until such time that stream banks re-stabilize and vegetation recovers. However, due to the magnitude of any potential increases in peak flows, the highly localized scour and bank destabilization that could occur, and the higher water and sediment capacities of mainstem streams, it would not be expected that these effects would be measurable at the HUC 6 level. This alternative would therefore meet ODEQ water quality standards at the project level and ACS objectives at the HUC 5 level.

Alternative 3

Watershed Hydrology
Alternative 3 proposes increasing open space within this Planning Area by approximately 2.4% as a result of 882 acres of timber harvest with prescriptions that would maintain less than 30% canopy closure, the construction of about 13 acres of roads and 25 acres of helicopter landings, and the expansion of 4 rock quarries totaling up to 25 acres. Within the Fortune Branch HUC 6 sub-watershed open space would increase by approximately 525 acres (3.8%) as a result of logging activities and road construction. Harvest units are being proposed in Fortune Branch on approximately 490 acres, and to access these acres an additional 7 acres of temporary and 1.5 acres of permanent road would be built. 2 quarries would be expanded for a total of up to 15 acres, and up to 10 acres of helicopter landings would also be constructed. For a total of about 27% open space within this HUC 6 sub-watershed. Within Windy Creek HUC 6 sub-watershed approximately 247 acres are proposed for harvest that would increase open space. Activities associated with this harvest would consist of constructing 4.5 acres of temporary and 1.5 acres of permanent ridgeline road, up to 13 acres of helicopter landings, and the expansion of 2 quarries by 5 acres each. These activities would increase open space within this sub-watershed by about 276 acres or 1.8%, for a total of approximately 30%. In Quines Creek HUC 6 sub-watershed 119 acres of harvest would add to open space, 0.2 acres of temporary road, and 2 acres helicopter landing construction of would increase open space by 0.7%. Open space would increase to about 23% under this alternative.

In the TSZ, harvesting is being proposed in Fortune Branch on 138 acres that would increase open space, and to access these acres an additional 6 acres of temporary roads and up to 4 acres of helicopter landings would be built. This would increase open space by 148 acres (7%) for a total of 26% open space within the TSZ of this HUC 6 sub-watershed. Within Windy Creek HUC 6 sub-watershed no additional open space would occur within the TSZ due to current baseline open space conditions of about 36%. In Quines Creek HUC 6 sub-watershed 83 acres of harvest, 1 acre of helicopter landing construction, and .2 miles of road construction would increase open space by about 85 acres (1%) for a total of about 23% open space in the TSZ of Quines Creek HUC 6 sub-watershed. Under Alternative 3 a total of 357 acres that would create open space in the TSZ as a result of harvest activities that were proposed under Alternative 2, would be deferred. Up to 5 additional acres of helicopter landing construction would be needed under this alternative.

Alternative 3 would defer all harvest prescriptions that would create open space (canopy closures under 30%) within the TSZ of HUC 7 drainages where baseline conditions currently exceed recommended amounts of open space. As a result of this, Alternative 3 would not be expected to result in localized peak flow enhancement within the tributary headwaters of these drainages, and would not cause an increase in bank erosion and subsequent sedimentation. Localized increases in water yields above current levels may still occur within the Fortune Branch HUC 6 sub-watershed 0306 and 0324 HUC 7 drainages and the Windy Creek HUC 6 sub-watershed 0418 and 0421 HUC 7 drainages as a result of harvesting that would still occur outside the TSZ. This is because these drainages would be harvested above 25% of the entire drainage areas, which research has shown to result in increased water yields (Church and Eaton, 2001). This would not be expected to measurability alter watershed hydrology at the HUC 6 scale, however, the implications of this for fish and other aquatics is discussed in section 3.4.3. All other impacts would be the same as those described under Alternative 2.

<u>Sedimentation and Turbidity</u>
There would be a minor increase in the amount of sediment that would enter streams as a result of upslope erosion under Alternative 3. It would be expected that a large majority of the mobilized sediment created during implementation of this alternative would remain within units, or become trapped downslope within riparian ecological protection zones before reaching the stream as a result of the PDFs and BMPs associated with this project. The exception would be where roads are hydrologically connected to streams, eliminating the buffer between the erosional source and the stream channel. Where this occurs, road drainage improvements would be made whenever feasible to reduce this connectivity. The amount of erosion contributing to increases in stream turbidity from upland erosion would be expected to be within Oregon DEQ water quality standards for turbidity under Alternative 3, and would not be expected to have any measurable adverse effects to aquatic habitat and would comply with ACS objectives. Additionally, because measurable increases in peak flows would be not occur under Alternative 3, there would be no additional sedimentation as a result of stream channel erosion. This would eliminate the negative effects on aquatic habitat at the HUC 7 and above, discussed under Alternative 2. Alternative 3 would therefore maintain water quality at the HUC 7 scale, would comply with ODEQ water quality standards at the project level, and ACS objectives at the HUC 5 scale.

3.4.3 Fisheries

3.4.3.1 Affected Environment

This Planning Area provides habitat for anadromous and resident salmonids, including Oregon Coast coho salmon, Oregon Coast steelhead, Oregon Coast cutthroat and rainbow trout. Non-game bureau tracking species such as Pacific lamprey also inhabit streams in the Planning Area. There are a total of 240 miles of stream within this Planning Area, 48 miles of which are fish-bearing streams. Fish-bearing streams are located throughout the planning area. Streams in this Planning Area range between 1st and 7th order. Seventy-three percent of the streams within the Planning Area are third order or below. Stream ordering is a system involving the following rules: a) fingertip tributaries originating at a source are designated order 1; b) the junction of two streams of order *u* forms a downstream channel segment of order $u + 1$; c) the junction of two streams of unequal order *u* and *v*, where $v>u$, creates a downstream segment having an order equal to the higher stream *v* (Knighton 1998).

<u>Aquatic Habitat</u>

Fish habitat within the Planning Area has been altered as a result of past timber harvest, roads, and agricultural practices adjacent to streams. Observations and monitoring suggest these altered conditions are currently limiting salmonid production, specifically rearing and spawning habitat, within the Planning Area. Fish habitat and riparian alterations resulting from past practices include the removal of riparian vegetation, a reduction of LWD, channel straightening, temperature increase, and the addition of sediment. Streams have become ecologically simplified and less effective in dissipating stream flow energy, scouring pools, providing complex habitat for fish, amphibians and invertebrates, and providing organic detritus. Past timber harvest on private and public land, and fire suppression, have altered or removed vegetative communities within the riparian reserves of nearly all streams within the Planning Area, creating many areas of young dense stands. The removal of riparian vegetation has led to increased water temperatures and reductions in the amount of LWD, pool habitat, and stream channel complexity. These stands often lack structural diversity Elements of structural diversity include but are not limited to large diameter trees, trees with large branches and full crowns, snags & large down logs, a closed canopy with some gaps, multiple canopy layers, a constituent of decadence, and presence of conifers as well as hardwood and shrub species. One consequence of limited structural diversity is the lack of development and recruitment of large wood debris (LWD).

Since the implementation of the NFP in 1994, management activities in riparian zones on public land have focused on the protection of riparian functions of in-stream wood recruitment, stream shade, and wildlife corridors. The reduction of logging activity, combined with management emphasis, has led to an improving trend in riparian and aquatic conditions.

LWD is an essential component of fish and aquatic habitat. LWD creates channel structure which creates pools, undercut banks, deflects and breaks up stream flow, and stabilizes the stream channel. Summer and winter juvenile rearing, adult holding, and spawning habitat are dependant on the presence of LWD in streams. LWD often creates log jams which creates pools and cover where adults can rest during migration and spawning. Log jams also accumulate and sort gravels necessary for spawning. The slow water and pools associated with log jams offers areas for juveniles to drift feed and the debris provides cover and protection from predators and high flows (Meehan 1991). LWD also traps salmon carcasses, which are important sources of nutrients for aquatic organisms, from flowing downstream (Middle Cow Creek WA).

Water quality is limited on approximately 21.6 miles of streams throughout the Planning Area where the established temperature criterion, of 17.8 degrees Celsius for anadromous fish rearing is not met. Windy Creek is additionally listed for habitat modification, meaning the stream does not meet LWD or pool frequency habitat criteria for anadromous salmonids.

High sediment loads can potentially fill pool habitat, cause increased width to depth ratios, cover spawning gravels, and cause streambed embeddedness. Pool depths between one and three meters have been shown to be necessary for successful rearing of salmon and steelhead (Brown et al, 1994). Within the Planning Area approximately 75% of fish bearing streams have a road in close proximity (approximately 1 site potential tree or 185 ft.) Roads contributing sediment to streams within the Planning Area are BLM, private, state and county owned and maintained. These roads are primary sources of chronic soil erosion and sediment input to streams, and reduce potential LWD, contributing to the degradation of fish habitat (Middle Cow Creek WA). Timber related impacts, primarily roads, open condition in the TSZ, and yarding, have resulted in increased amounts of fine sediment within stream substrate interstices, lowering primary production and invertebrate abundance, and decreasing the availability of cover for juvenile salmonids (Hicks et al. 1991). Sediment also degrades spawning habitat. Redds, the area in the stream bottom in which fish deposit eggs, need a steady flow of cold, clean water to deliver oxygen and remove waste products.

Oregon Department of Fish and Wildlife (ODFW) aquatic habitat inventory surveys were conducted in 1999. This is the most recent habitat data available for streams within the planning area. Streams are surveyed from the mouth to the upper extent of fish habitat. The surveys include BLM and private land. In some cases access was denied on private property and surveys were not conducted in those reaches. Surveys indicate the amounts of fine sediment (silt/sand) within some fish bearing reaches of streams within this Planning Area are above thresholds (see Table 3-11). Some of the streams in the Planning Area which ODFW surveyed showed higher amounts of fines in the upper reaches of the stream. Thresholds were established by the National Marine Fisheries Service (NMFS) for streams to be considered as properly functioning for anadromous salmonids. The thresholds for fines established streams with 20% fines or less within gravels to be properly functioning.

Table 3 - 11. ODFW Aquatic Habitat Inventory Survey Data

Stream	Reach #	Length (m)	Gradient (%)	LWD-Key pieces/100m	Silt/ Sand (%)	Residual Pool Depth	Active Erosion	Pool Area (%)	Pool Freq.
Windy	1	2531	1	0	0	0.6	8	61	5
	2	3088	1	0	3	0.8	21	57	7
	3	847	0.3	0	Dry	0	0	Dry	Dry
	4	4983	1.2	0.2	6	0.5	26	47	10
	5	2923	2.3	0.2	4	0.5	15	40	13
	6	1162	3.6	0	39	0.4	22	17	40
Wood	1	891	0.7	0	18	0.5	26	43	8
	2	3588	2	0.1	18	0.4	6	20	16
	3	1431	0.7	0.5	24	0.4	17	14	16

Bear	1	824	1.1	0.1	20	0.7	32	59	11
	2	2581	4.2	0.2	22	0.4	47	12	39
	3	900	8.7	0.2	25	0.3	54	10	56
Lawson	1	1708	2.7	0.1	32	0.5	18	32	27
	2	1860	7.9	0.8	15	0.3	30	6	105
Fortune Branch	1	2472	2.6	0.2	16	0.5	38	46	11
	2	2854	8	0.4	23	0.5	25	25	25
Quines	1	2304	1.4	0	15	0.6	19	53	5
	2	3022	3.4	0.4	15	0.7	2	33	9
	3	2242	4.6	0	15	0.4	0	27	10
	4	2508	12.7	0.8	14	0	5	Dry	Dry

Special Status Species

Bureau Sensitive

Oregon Coast coho salmon are a Bureau Sensitive species. A total of 32.2 miles of stream within this Planning Area provide habitat for Oregon Coast coho salmon. The distribution of Oregon Coast coho habitat miles within the Planning Area are shown in Table 3-12.

The National Marine Fisheries Service (NMFS) ruled on January 17, 2006 Oregon Coast coho were not warranted for listing on the Endangered Species Act (ESA) (50 CFR Part 223). The best scientific and commercial information available was used to determine the Oregon Coast coho Evolutionary Significant Unit (ESU) was not in danger of extinction throughout all or a significant portion of its range, nor was it likely to become so within the foreseeable future. An assessment was conducted in Oregon with efforts from all state natural resource agencies and several Federal partners. NMFS used this assessment in the determination for ruling Oregon Coast coho were not warranted for listing. The assessment was a rigorous analysis of the viability of the Oregon Coast coho ESU, past and continuing threats to coho population and the ESU, and protective efforts under the Oregon Plan aimed at addressing the factors associated with the ESU's decline. The Oregon Plan is a framework of state laws, rules, and executive orders designed to enhance and protect watershed health, at-risk species, and water quality by governing forest and agricultural practices, water diversion, wetlands, water quality, and fish and wildlife protections. The assessment concluded the Oregon Coast coho ESU is currently viable, with the component populations generally demonstrating sufficient abundance, productivity, distribution, and diversity to be sustained under the current and foreseeable range of future environmental conditions (50 CFR Part 223).

A Draft Oregon Native Fish Status Report was released by the Oregon Department of Fish and Wildlife (ODFW) in 2005. ODFW developed six criteria to assess the status of many of the native fish species in Oregon. The six criteria included existing populations, habitat use distribution, abundance, productivity, reproductive independence, and hybridization. The purpose of the report was to flag acute problems and identify priorities for more detailed conservation planning evaluations. Within the Oregon Coast ESU all six of the criteria were met by at least 80% of the smaller populations within the ESA. The smaller population, which the Planning Area is located within, for Oregon Coastal coho ESU is the Upper Umpqua. The Upper Umpqua population met five of the six criteria used to assess the population. Until recently, numbers have been at or near record lows. However, numbers, distributions and productivity have rebounded for most populations within the ESU in the last four years following improved ocean productivity. These improvements have eased near term risks, but it is not clear whether all underlying factors for the recent decline have been addressed or if this is just a temporary response to improved ocean conditions. (http://www.dfw.state.or.us/fish/ONFSR/report.asp#coho)

Table 3 – 12. Estimated miles of Oregon Coast coho habitat in the Westside Planning Area.

Stream Name	Miles of coho habitat
Cow Creek	11.0
Windy Creek and tributary	9.1
Fortune Branch	3.0
Woodford Creek	2.0
Wood Creek and tributaries	4.0
Bear Creek	2.2
Lawson Creek	0.9

* Information obtained from BLM GIS layers and ODFW Fish Distribution http://rainbow.dfw.state.or.us/nrimp/information/fishdistmaps.htm, and Middle Cow Watershed Analysis.

Oregon Coast winter steelhead (a Bureau Sensitive Species) also inhabit these streams. In many cases the habitat of these fish extends above coho salmon into the lower order streams with higher stream gradients. See Table 3-13 for stream miles with steelhead habitat.

NMFS ruled on March 29, 1998 Oregon Coast steelhead were not warranted for listing under the Endangered Species Act (50 CFR Part 227.) On April 15, 2004 NMFS placed Oregon Coast steelhead on the species of concern list (Federal Register / Vol.69, No73/ April 15, 2004 / Notices/19975.) NMFS uses the term "species of concern" to identify species about which NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. NMFS is not actively considering listing this species under the ESA.

The Draft Oregon Native Fish Status Report, released by the Oregon Department of Fish and Wildlife in 2005, concluded the Oregon Coastal winter steelhead ESU had met five of the six criteria. The smaller population for the Oregon Coastal winter steelhead ESU is the South Umpqua. The South Umpqua population, which the project is located within, met six of the six criteria. (http://www.dfw.state.or.us/fish/ONFSR/report.asp#coho).

Table 3 – 13. Estimated miles of Oregon Coast winter steelhead habitat in the Westside Planning Area.*

Stream Name	Miles of steelhead habitat
Cow Creek	11.0
Windy Creek and tributary	9.7
Fortune Branch	4.1
Woodford Creek	3.3
Wood Creek and tributaries	5.3
Bear Creek	2.9
Lawson Creek	2.0

* Information obtained from BLM GIS layers and ODFW Fish Distribution http://rainbow.dfw.state.or.us/nrimp/information/fishdistmaps.htm, and Middle Cow Watershed Analysis.

Salmonid Life History

Oregon Coast Coho
Spawning occurs in the fall to early winter, young fish emerge from redds in the spring, and the juveniles rear in fresh water for one or more years before migrating to the sea (Meehan 1991). Coho adults generally move into smaller streams to spawn during the first couple rain storms which provide enough rain to raise water levels. Because juvenile coho spend one or more years in freshwater, summer and winter rearing habitat is important. High water temperatures and low flows in the summer can limit juvenile survival. Without winter rearing habitat, such as cover, pools, and side channels, juvenile survival could be limited.

Oregon Coast Winter Steelhead
Steelhead juveniles can spend up to four years rearing in freshwater before migrating to the ocean. As with coho, summer and winter rearing habitat for steelhead is important due to the extended length of time juveniles spend in freshwater. Juveniles migrate to the sea in the spring. The winter steelhead found in this Planning Area generally spawn in late winter or spring. In small coastal streams, up to 30% of the adults may survive to spawn a second or third time, but in large drainages where fish migrate long distances, the proportion of fish which spawn more than once is much lower (Meehan 1991).

3.4.3.2 Environmental Effects

Alternative 1 (No Action)
Aquatic habitat would improve over time as riparian reserves develop naturally and provide more LWD. When trees fall within 1 site potential tree (185 feet for this planning area) of stream channels, all or a portion of the tree could be within the steam channel. This would be based on the location of the tree in relation to the channel, the tree height, topography and the direction the tree falls. When a log or a portion of a log is within the active channel width of a stream, it functions as LWD. Leaving the riparian reserves in its presently overstocked condition would lengthen the time for recovery (50-130 years) of sufficient large conifers to provide an adequate source of LWD for streams. LWD levels would remain low in most streams for a longer time if left untreated, resulting in lower habitat complexity. Studies show streams with low habitat complexity during winter flows reduces juvenile fish survival because refuge from high flows is either lacking or non-existent (Solazzi, et al. 2000, Pearsons, et al. 1992). Therefore, we expect reduced fish survival during winter high flows until LWD levels increase.

Riparian areas would remain densely stocked under Alternative 1. High fuel loads and dense stocking make these areas prone to disease and fire. These conditions increase the potential for a high intensity or severity type of wildfire to occur within riparian reserves. Such a fire could result in the loss of canopy closure, tree mortality, and an increase in soil erosion. This could result in an increase in stream temperature, a loss of future LWD recruitment, and an increase in sediment in streams. These effects could reduce the quality of fish habitat.

The 0.74 miles of roads proposed for decommissioning under the Action Alternatives would remain. The BLM roads proposed for road maintenance, which includes improving drainage and upgrading culverts and crossdrains, would not occur under Alternative 1. Sediment input from roads occurs when the roads cross streams, are located adjacent to streams, and/or have roadside ditches and cross drains which area connected to streams. Existing sources of sediment from roads would continue under Alternative 1. The risk of culvert failures, due to undersized and failing pipes, would also remain. These effects would have short and long term indirect negative effects to stream sediment levels and fish production. The levels of sediment currently in stream channels within the Planning Area would remain the same or increase in the short and long term. A reduction of sediment would not be expected. Excess sediment would continue to enter streams, resulting in a reduction of spawning production, juvenile rearing survival, and insect production (Waters 1995; Meehan 1991; Everest, et al. 1987; Meyer et al. 2005).

Habitat conditions for Special Status Species including Oregon Coast coho salmon and Oregon Coast winter steelhead remain at the existing conditions under Alternative 1 in the short term (1-2 years). The chronic sources of sediment from roads, TSZ openings, and non-federal logging operations and existing young/overstocked Riparian Reserves would continue under this Alternative. Local fish production levels would continue to improve but at a slow rate because optimal feeding and breeding activity would be limited due to high sediment levels from road sources and winter survival would be limited due to low habitat complexity due to the lack of stream LWD and adequate sources of future LWD in Riparian Reserves.

Actions such as restoration, fuels reduction, and timber management may occur within this watershed under a different EA at a later time. Selection of this Alternative would not eliminate activities within these watersheds, but may defer them until a later time.

Alternative 2 (Proposed Action)

Note to reader: The bold headings below are the proposed actions. The headings in italics are elements of fish habitat having the potential of being affected by the proposed action.

See Appendix 2, Water Quality, for the discussion on determination of no effects to water temperature.

The salmonid species found within the Planning Area which require an effects analysis include Oregon Coast coho and Oregon Coast winter steelhead. These two species have similar habitat requirements and life histories. Therefore, these two species will be grouped together when discussing the effects of the proposed actions and will be referred to generally as fish or fish habitat.

Riparian Reserve Vegetation Management (includes thinning and fuels reduction)
Riparian reserves within this project have 4 different buffers. Each area within the buffers would have different treatments, including a no treatment area. The treatments within the areas were designed to protect water quality and fish habitat. These areas and treatments are described in section 2.3.7, Streams and Riparian Zones. Treatments within riparian reserves would occur adjacent to perennial and intermittent streams which flow into fish-bearing streams. Treatments would also occur immediately adjacent to fish-bearing streams.

LWD
Immediate and future recruitment of LWD to streams would not be negatively affected from the proposed riparian reserve vegetation treatments. The no treatment areas and the ecological protection zone would maintain more than adequate amounts of immediate and future LWD.

Sediment
Sediment input to fish habitat would not be expected to occur from the vegetation treatments within riparian reserves. The no treatment areas and the ecological protection zone would prevent sediment from entering stream channels and thus fish habitat.

Beneficial Effects to Fish Habitat
Commercial thinning, non-commercial thinning, and fuels reduction treatments within riparian reserves would help to improve fish habitat by reducing stand densities. A reduction in stand densities in young dense stands would allow for the development of late successional riparian characteristics. Some of these characteristics include multi-level canopy cover which helps to maintain cool water temperatures. Late successional characteristics in riparian areas also include downed coarse woody debris and LWD which

provides nutrient inputs to stream and increases channel complexity. The importance of channel complexity and LWD to fish habitat was discussed in the fisheries affected environment section above. Late successional characteristics in riparian areas also include diverse species composition which provides a variety of chemical and biological inputs to streams.

These treatments also reduce the spread of disease and the risk of a high intensity or severity fire within riparian reserves. Such a fire could result in a reduction in shade and tree mortality. These actions could negatively affect fish habitat by an increase in water temperature, a reduction in future recruitment of LWD, an increase in soil erosion and sediment entering fish habitat.

Timber Harvesting/Yarding

Sediment

Yarding associated with timber harvest would not result in sediment entering fish habitat because of the PDFs in this EA which include the BMPs within the RMP for timber harvest practices. Ground disturbing yarding activities would not be allowed within the ecological protection zones established in section 2.3.7 Streams and Riparian Zones of the PDFs. The exception to this PDF is the temporary stream crossing in T32S R5W section 17, unit 17-1. This crossing would involve a piece of equipment crossing the stream twice in order to access and leave a unit. Logs would not be yarded across the channel. The crossing is approximately 500 feet from fish habitat in Fortune Branch Creek. The crossing would result in some soil disturbance adjacent to the stream channel and thus sediment could enter the channel. Due to the limited number of times (2) the machine would cross the channel and the small area of soil disturbance, sediment is not expected to reach fish habitat. The amount of oil or fuel which could enter the stream when the machine crosses the channel would be immeasurable because 1) the small area of wetted width (approximately 3-5 feet) for the machine to come into contact with, 2) the shallow depth of water (approximately 0.25-1.0 foot) would submerge only a small percentage of the machine's tires or tracks, and the PDF within 2.3.7 Stream and Riparian zones which states in part "Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition in order to minimize potential for leakage into streams."

Peak Flows

Increases in peak flows are expected to occur within 5 HUC 7 drainages. See Table 3-14 for a description of these HUC 7 drainages and other pertinent information. Potential effects to fish habitat will be discussed in terms of the major stream located within a HUC 7 basin. These increases would be the result of regeneration and overstory removal harvest creating additional open space within transient snow zones.

Table 3 – 14. HUC 7 Basins Affected from Increases in Peak Flows

HUC 6 Sub-Watershed	HUC 7 Basin	Stream Name	Fish Habitat
Fortune Branch	------------------------	-------------------------	----------------
-------------------------	0306	Fortune Branch	Yes

-------------------------	0324	Tunnel Creek	No
Windy Creek	-------------------------	--------------------------	----------------
-------------------------	0409	Lawson Creek	Yes
-------------------------	0418	Wood Creek	Yes
-------------------------	0421	Deeds Creek	No

Fortune Branch HUC 6 –
According to the section 3.4.2 Water Resources, increases in peak flows would not be measurable at the HUC 6 scale. Therefore negative effects to fish habitat in Fortune Branch or Cow Creek would not be expected.

0306 Fortune Branch HUC 7 –
Fish habitat is present in Fortune Branch Creek within this HUC 7. Approximately 24% of the HUC 7 acres and 31% of the TSZ acres within this HUC 7 are in, or nearing, an advanced stage of hydrologic recovery. This would likely be reducing baseline open space effects, resulting in low or less severe flow enhancements. Measurable channel erosion and sediment input to fish habitat in Fortune Branch is not expected. The reasons for this determination include

- Percent of open space in or nearing an advanced stage of hydrologic recovery
- Existing streambank conditions
- Increased channel capacity where fish habitat is present
- The relatively low or less severe flow enhancements which would be expected

0324 Tunnel Creek HUC 7 –
Fish Habitat is not present within Tunnel Creek, the main stream within this HUC 7. Tunnel Creek flows into Cow Creek, a large fish bearing stream. This HUC 7 basin only has 4.5% of its acres within the TSZ making any potential TSZ open space effects localized to only a couple headwater tributaries. Given the location of the potential units in the headwaters of this drainage, it would not be expected sediment input resulting from increased channel erosion would affect fish habitat downstream in the much larger Cow Creek.

Windy Creek HUC 6 -
According to the section 3.4.2 Water Resources, increases in peak flows would not be measurable at the HUC 6 scale. Therefore negative effects to fish habitat Windy Creek or Cow Creek would not be expected.

0409 Lawson Creek HUC 7 –
Fish habitat is present in Lawson Creek within this HUC 7. Approximately 33% of this watershed is within the TSZ and the watershed as a whole would remain under 25% open condition. As a result, any impacts to the stream channel would be expected to be localized in the tributaries and upper reaches of Lawson Creek where a majority of the past and current open space conditions in this watershed would be situated. Within this HUC 7, there are currently no signs of increased channel erosion on BLM land below the

headwaters of the most impacted area. This basin currently has about 20% open space overall and a road density of approximately 2.4mi/mi^2 (or 1%). There has been little disturbance between the TSZ open space and the streams below. As a result, most of the additional flow generated as a result of TSZ openings is reabsorbed into the vegetated landscape below, and is not resulting in increased peak flows or sediment input within stream channels. Because there are no mapped streams within any of these disturbed acres, and the riparian zones on the streams below are generally in good condition with larger trees and established streamside vegetation in the headwater tributaries there would be little chance of stream bank erosion occurring as a result of increased flows within this watershed. Therefore any increase in channel erosion or sediment input within this HUC 7 basin would immeasurable upon reaching fish habitat downstream in Lawson Creek.

<u>0418 Wood Creek HUC 7 –</u>
Fish habitat is present in Wood Creek within this HUC 7. See Tables 3-7 and 3-8 for miles of habitat. Alternative 2 proposes creating additional open space within this HUC 7. The creation of additional open space when combined with the existing condition within this HUC 7 increases the potential of an increase in peak flows occurring. Depending on the magnitude of the increase in peak flow, there is a potential for the increase in peak flow to negatively effect fish habitat. An increase in peak flows could lead to additional inputs of sediment to fish habitat and channel instability (including bed and bank erosion) from increased flows. Based on the conclusions reached in section 3.4.2 Water Resources from a potential increase in peak flows, potential effects to fish habitat can be explored. The channel erosion and increased sediment would not however, substantially alter fish habitat within Wood Creek rather the effect would be a minor reduction in quality of fish habitat. The increased peak flows would result in localized effects of in channel erosion. In other words, channel erosion would not be expected to occur along entire stretches of streams, but rather short discontinuous sections. Small pockets of sediment, resulting from an increase in peak flows, may be deposited in Wood Creek. These small sediment depositions within habitat units (pools, riffles, etc.) would not remove the ability of fish to use these areas for carrying out activities such as spawning, rearing or holding. Even in light of a potential minor reduction in quality of fish habitat, sufficient fish habitat within this HUC 7 would remain available under Alternative 2 for fish to carry out life cycles. The potential for an increase in peak flows would be reduced because full Northwest Forest Plan riparian reserve buffers would be retained within regeneration or overstory removal units. In addition, there are no regeneration or overstory reduction units adjacent to fish habitat in Wood Creek.

The Bureau Sensitive species found within Wood Creek include Oregon Coast coho and Oregon Coast winter steelhead. As discussed in the fisheries affected environment section above, the populations within the ESU as a whole and within the smaller populations, which the project is located in, have improving numbers. The proposed actions within Wood Creek would not cause a reduction in population within the ESUs or the smaller populations of Oregon Coast coho or Oregon Coast winter steelhead because sufficient quantity and quality of habitat would remain in Wood Creek for coho and steelhead to utilize. Therefore the negative effects to habitat used by these species would not be expected to contribute to the need to list these species under the Endangered Species Act. The factors which led to this conclusion include:

- The minor reduction of quality of fish habitat.
- The localized effects of in stream erosion.
- The small scale of the effects. The effects would be measurable at the HUC 7 scale but not at a HUC 6 or HUC 5 scale.

<u>0421 Deeds Creek HUC 7 –</u>
There are no fish bearing streams within this HUC 7 basin. Deeds Creek flows into Windy Creek, a larger stream with fish habitat. Increased channel erosion or sediment loads within this 0421 HUC 7 basin would be diluted to the point of being undetectable upon entering fish habitat in Windy Creek. Therefore any impacts resulting from increased peak flows within this HUC 7 watershed would be immeasurable in terms of effects to fish habitat within Windy Creek.

Road Work
Road work includes new construction, reconstruction, road maintenance, bridge replacement, road decommissioning and hauling. The replacement of existing draw culverts and cross drains is a function of road reconstruction and maintenance. The proposed draw culvert replacements are not located on fish-bearing streams, but rather on intermittent or perennial streams which flow into fish habitat located in Fortune Branch Creek, Windy Creek, and a fish-bearing unnamed tributary of Windy Creek in T32S R5W section 8.

Sediment
Approximately 9 draw culverts are proposed for replacement. Six of the culverts are within the Fortune Branch HUC 7 (0306). These culverts are located on intermittent streams approximately 30 feet, 60 feet, 118 feet, 200 feet, 1025 feet, and 1165 feet upstream from fish habitat in Fortune Branch Creek. The other three are within the Windy Creek HUC 7 (0403). Two of these culverts are on perennial streams which flow approximately 1340 and 650 feet before entering fish habitat in an unnamed tributary to Windy Creek. The third culvert is located on an intermittent stream approximately 245 feet from fish habitat in the unnamed tributary to Windy Creek. The bridge replacement is located over fish habitat in Windy Creek. The road maintenance, reconstruction and hauling are proposed for roads which cross intermittent, perennial, and fish bearing streams. Some of these roads also parallel fish bearing streams in some spots as close as 30 feet.

Because of the close proximity of the road related activities (excluding new road construction) sediment would reach fish habitat. This sediment would be expected to be seen in fish habitat during the first winter. Because of the PDFs which include the BMPs within the RMP, the amount of sediment reaching fish habitat from road related activities would be minimal. The amount entering fish habitat would not cause turbidity to the point of disrupting fish behavior. Such behavior during the first winter when sediment would be entering fish habitat would include spawning, juvenile rearing, and juvenile feeding. The amount of sediment would not cause a reduction in macroinvertebrates, which are a food source for fish. Sediment input would not cause a detectable change in fish habitat. For example changes in embeddedness, interstitial spaces, and pool depth would not be measurable. Following the first winter and thereafter sediment entering fish habitat would decrease to the point of being immeasurable. Because of the above explanation the proposed road activities would not contribute to the need to list the Bureau sensitive Oregon Coast coho or Oregon Coast winter steelhead.

The proposed new road construction (permanent and temporary) and the subsequent decommissioning of the temporary roads are not expected to result in sediment reaching fish habitat. The closest new road to fish habitat is approximately 0.2 miles away. Because of the location of the roads, the proximity to fish habitat, the lack of stream crossings, the lack of new construction within riparian reserves and the PDFs and BMPs which guide the design and construction of new roads there are no mechanisms for sediment to be transported to fish habitat.

Beneficial Effects to Fish Habitat
Road maintenance, reconstruction, and decommissioning would generally reduce chronic erosion problems and reduce sediment input to fish habitat. Replacing failing culverts with ones sized to meet 100 year flood events would reduce the risk of culverts plugging and washing out. Culvert failures result in the fill within the road prism entering stream channels, increasing sediment loads in fish habitat.

Alternative 3

Riparian Reserve Vegetation Management (includes thinning and fuels reduction)
Vegetation treatments planned within riparian reserves under Alternative 3 are the same as those under Alternative 2. The effects discussed under Alternative 2 would be the same as for Alternative 3.

Timber Harvesting/Yarding

Sediment
Yarding practices would be the same in Alternative 3 as proposed in Alternative 2. The effects discussed under Alternative 2 would be the same as for Alternative 3.

Peak Flows
Under Alternative 3, potential negative effects to fish habitat from increases in peak flow would be immeasurable as there would not be increases in open space within in the TSZ of HUC 7 drainages exceeding the recommended amounts of open space in TSZs. Alternative 3 would not be expected to result in localized peak flow enhancement within the tributary headwaters of these drainages, and would not cause an increase in channel erosion and subsequent sediment input. Therefore fish habitat would not be affected as a result of timber harvest.

Road Work
With the exception of new road construction, road activities planned under Alternative 3 are the same as those under Alternative 2. The effects discussed under Alternative 2 would

be the same as for Alternative 3. The changes in new road construction within Alternative 3 are consistent with the effects determination for the new road construction proposed under Alternative 2.

3.4.4 Cumulative Effects to Soils, Water Resources, and Fisheries

Cumulative Effects to Soil and Water

Because ODEQ water quality standards and soil productivity standards under the RMP are at the project level, cumulative effects of these environmental elements have been analyzed for the planning area, which includes three HUC 6 sub-watersheds that make up this Planning Area. Analyzing elements of the environment, such as watershed hydrology and water quality, only at the HUC 5 scale would result in undetectable effects due to the larger flow capacities of these larger stream channels, and different lag-times associated with flow contributions from the various drainages that reaching a given location within the mainstem of a stream. As such, information at the HUC 5 scale would not provide the decision maker with the best available information to assist them in reaching a decision as to whether the effects of this project, when put in context with other activities within the planning area, would exceed ODEQ water quality, or Medford RMP soil productivity standards. ACS objectives, which are measured at the HUC 5 scale, must still be considered in order to ensure that this project won't cumulatively elevate effects that are occurring within this HUC 5 watershed to a level that would result in the degradation of aquatic and riparian habitat or species. However, if there are no detectable effects found to be occurring at the HUC 6 scale, within any of the HUC 6 sub-watersheds that make up this planning area, then there would also be no detectable effects from this project on aquatic species at the HUC 5 scale. Each HUC 6 within this Planning Area has been analyzed separately for direct and indirect effects. Cumulative effects of this project are therefore a combination of these past and proposed effects, as well as the effects of any other current or potential future, federal or non-federal projects within these three HUC6 sub-watersheds.

Past events in these HUC 6 sub-watersheds created approximately 11,650 acres, or 24%, of open area within these three HUC 6 sub-watersheds between 1974 and 2005. Current information on cleared acres since 2002 has not yet been incorporated into the Medford Change Detection GIS system which was used to assess open space between 1974 and 2002. The estimated number of open space acres that occurred between 2002 and 2005, were based on recent field observations. The estimated open space acres for 2002-2005 include observed harvest units and the addition of 25-30 acres of new road, built to access these harvest units. Additionally there are approximately 843 acres of regeneration and clearcut harvest planned to occur within these three HUC 6 watersheds as a result of other non-federal operations during 2006. There are also 4.9 miles of new roads planned. This information is based on ODF New Notifications and Renewals report for December 1, 2005 (Copies available at the BLM Grants Pass Interagency Office). There are no known future regeneration harvest or overstory removal timber management projects within this Planning Area on Federal lands that would result in additional open space. For future activities on non-federal land, GIS was used to estimate the current number of forested acres of non-federal land within this Planning Area which are presently at, or nearing, the current rotation age of 40 years. It was determined through this process that based on stand age approximately 17,000 acres could be available for harvest within these HUC 6 sub-watersheds in the next 5 years. Using the maximum number of acres harvested in the past within this Planning Area since the implementation of the NFP (2000 acres over 3 years), it was assumed that up to 3,300 acres could potentially be harvested within this Planning Area during the next 5 years (maximum life of this project). Including past harvest that occurred prior to 2005, the proposed harvest for 2006, and all the predicted acres that could potentially be harvested independently of this project in the future, open space would increase within this these HUC 6 sub-watersheds to approximately 34% within the next five years. Under Alternative 2, the Westside project would commercially harvest a total of about 3,374 acres, up to 1,377 of these acres would result in an increase in open space, due to harvest prescriptions that reduce canopy closures below 30%. Under Alternative 3, a total of approximately 3009 acres would be logged commercially, with about 882 acres of additional open space within this planning area. Together with past, present, and potential future actions, this project would increase open space in these HUC 6 sub-watersheds to about 36% under Alternative 2, and 35% under Alternative 3.

Within the TSZ past events in these HUC 6 sub-watersheds created approximately 3660 acres, or 27%, of open area within this Planning Area between 1974 and 2006. Current information on cleared acres since 2002 has not yet been incorporated into the Medford Change Detection GIS system which was used to assess open space between 1974 and 2002. The estimated number of open space acres harvested in the TSZ between 2002 and 2005, were based on recent field observations. The estimated open space acres for 2002-2005 include observed harvest units and the addition of approximately 5 acres of new road, built to access these harvest units. There are no known future regeneration harvest or overstory removal timber management projects within this Planning Area on Federal lands that would result in additional open space. For future activities within the TSZ on non-federal land, GIS was used to estimate the current number of forested acres of non-federal land within the TSZ of this Planning Area which are presently at, or nearing, the current rotation age of 40 years. It was determined through this process that based on stand age over 5,000 acres could be available for harvest on non-federal lands within the TSZ of this Planning Area in the next 5 years. Using the maximum number of acres harvested in the past within the TSZ of these three HUC 6 sub-watersheds since the implementation of the NFP (200 acres over 3 years), it was assumed that up to 330 acres could potentially be harvested within the TSZ of these watersheds during the next 5 years (maximum life of this project). Including past harvest that occurred prior to 2005 and all the predicted acres that could potentially be harvested independently of this project in the future, open space would be increased within the TSZ of these HUC 6 sub-watersheds to approximately 29% within the next five years. Under Alternative 2, the Westside project would commercially harvest a total of about 600 acres within the TSZ of this Planning Area that would result in an increase in open space, due to harvest prescriptions that reduce canopy closures below 30%. Under Alternative 3, a total of approximately 230 acres would be logged commercially within the TSZ that would create additional open space within this planning area. Together with past, present, and potential future actions, this project would increase open space within the TSZ of this Planning Area to about 33% under Alternative 2, and 31% under Alternative 3.

As a result of these open space conditions, within the TSZ and within the watershed as a whole, localized effects to water quality and quantity would be expected to occur within some HUC 7 drainages where concentrated areas of open space exist, or are created, as a result of all past, present, and future disturbance within this planning area. Where these openings are within the TSZ, open space related increases in peak flows, which would be of the magnitude that would cause channel scour, would likely only occur within the headwater streams. Measurable peak flow increases are only expected to occur at the HUC 7 drainage scale within headwater tributaries because approximately 25% of these open space acres within the TSZ are at, or nearing, an advanced stage of hydrologic recovery within this planning area, which is reducing the effects that would result from open space conditions, and because research by Duncan (1986), Bosch and Hewlett (1982), and Harr, 1989 found that in watersheds of comparable size to this planning area, changes in peak flows are insignificant and immeasurable in all but the small tributary streams (See Section 3.4.2, Affected Environment). When assessing the effects of peak flows and water yields that may occur at the Planning Area and HUC 5 scales, as a result of potential future open space that could be created by all potential federal and non-federal actions, several considerations were made. First, it would be expected that peak flow increases within the tributaries streams of this watershed would be of a moderate to low magnitude, based on the total number of TSZ acres within these drainages, the percentage of these acres that are in open space condition, and the amount of acres that are in, or nearing, an advanced stage of hydrologic recovery. Lower streamflow and adequate sediment storage generally exists within these tributary systems which would cause any additional sediment that may be produced by increased peak flows to be deposited within or below the tributary streams. These sediment deposits would then generally be released in pulses during high flow events. Since this would mean only a portion of the additional sediment deposited within a channel as a result of upstream channel scour would be mobile at a time, and that transport would occur primarily when streamflow is high, the small amount of sediment that would be transported, into HUC 6 watershed and larger scale streams, during high flow events would be reduced to the point of immeasurable. Because research shows that water yield increases are generally in proportion to the amount of acres of forest cover removed (Church and Eaton, 2001), and this Planning Area would only be exceeding the initial point of concern by a maximum of 11%, with approximately 25% of these disturbed acres currently at, or nearing, an advanced stage of hydrologic recovery, it would not be expected that measurable increases in water yields would be seen at the Planning Area or HUC 5 scale. Since all potential peak flow and water yield impacts that are associated with past, present, and future projects within this Planning Area, including the Westside project, would not be expected to be measurable at the Planning Area or larger HUC 5 scale, ODEQ water quality standards, which are at the project scale, and ACS objectives designated under the NFP, which are at the HUC 5 scale, would not be exceeded.

A combination of cable, tractor, and helicopter yarding was used within these HUC 6 sub-watersheds in past harvesting operations. As a result of these activities, about 2,450 acres (5.1%) of soil disturbance, 2010 acres (4.2%) of compacted soil and the equivalent of up to 1660 acres (3.5%) of lost soil productivity has occurred within the these watersheds in the last 32 years. Potential acres of disturbed and displaced soils, resulting from harvest related activities associated with the Westside project are, 240 for Alternative 2, and 215 for

Alternative 3. Westside would also result in compacted ground and soil productivity losses up to 176 acres and 141 acres respectively under Alternative 2, and 162 acres and 118 acres respectively under Alternative 3. Additionally, approximately 9 acres would be disturbed, 6 acres compacted, and about 4 acres of lost soil productivity may occur within the Quines Creek HUC 6 sub-watershed in this Planning Area as a result of harvest activities associated with 165 acres of commercial harvest under the Middle Cow Landscape project. Approximately 265 acres would also be disturbed as a result of harvest activities associated with the 2400 acres of commercial harvest currently occurring within this Planning Area on private, state, and federal lands, independently of the Westside or Middle Cow projects (ODF New Notifications and Renewals, Dec, 2005). Up to 390 acres land disturbance would be expected to occur within these HUC 6 sub-watersheds in conjunction with the 3300 acres of future non-federal harvest that was estimated to occur based on GIS and trend analysis, during the next 5 years. These future activities, occurring independently of the proposed Westside or Middle Cow BLM projects would also be expected to result in compaction on up to 465 acres of ground and productivity losses equivalent to up to 330 acres. Some of the 2400 acres that are reported in the ODF New Notifications and Renewals are likely being double counted with the 3300 acres that were estimated for future harvest on non-federal lands using GIS. However, there is no way to determine the number of acres that this would apply to, so all acres have been included to determine the maximum possible disturbance, compaction, and productivity losses that could potentially occur in the next 5 years. The combined percentage of disturbed soils in these 3 HUC 6 sub-watersheds, including all known past, present, and known future operations on federal and private lands, would total a maximum of approximately 6.6% under Alternative 1, 7.1% under Alternative 2, and 7.0% under Alternative 3. For compacted soils, the combined percentage would be 5.3% for Alternative 1, 5.7% for Alternative 2, and 5.6% for Alternative 3. Combined productivity losses would be 4.2% for Alternative 1, 4.5% for Alternative 2, and 4.4% for Alternative 3. Some of these effects for federal projects would be mitigated on Medford BLM land through sub-soiling of temporary roads, and skid trails, where possible, which can remove up to 80% of the compaction created. Additionally, it would be expected that natural recovery is occurring within this planning area, and that as a result, compacted and displaced soils would be slowly recovering, partially restoring past losses to productivity. However because this analysis only includes disturbance less than 32 years ago, the amount of this recovery would not be expected to alter these maximum percentages. Cumulatively, without taking into account any natural recovery or mitigation, under all alternatives, compacted areas and productivity losses within these sub-watersheds, and this planning area, would remain below the maximum of 12% compaction and 5% productivity loss guidelines established within the NFP and the Medford RMP (PRMP Vol.3, Appendix V, pg 18 & 20).

Road building, maintenance, reconstruction, and use are all contributing to erosion within this watershed. Chronic erosion is currently ongoing due to road densities between 3.9-5.1mi/mi^2 (US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) target of 2 mi/mi^2 for streams to be considered in properly functioning condition (USFS, et al., 2004)) and as a result of these HUC 6 watersheds which make up this Planning Area having between 34%- 50.5% of unpaved roads. This project proposes to increase the number of permanent roads within this watershed by approximately 0.5 miles but have a net decrease with road decommissioning. This permanent road would be located on a ridgeline and would be spot rocked as necessary to keep the amount of erosion minimal and the amount of sediment that could be mobilized to the stream within ODEQ water quality standards. This road would not be hydrologically connected to the stream. Up to 5.6 miles of temporary roads and 2.4 miles of road reconstruction are also proposed under the Westside project. The Middle Cow Landscape project does not propose any permanent roads, however 1.6 miles of temporary roads are proposed. There are also 4.9 miles of known road building or reconstruction proposals associated with federal and non-federal projects (ODF New Notifications and Renewals) in this Planning Area. Road use by private industry is expected to continue in association with current and proposed future projects.The Westside Project proposes maintenance and reconstruction of up to 93 miles of haul roads within this project and the Roseburg BLM is proposing to haul approximately 4 million board feet down the Fortune Branch Road in association with the Screen Pass Timber Sale. Federal projects do not allow for wet weather winter haul on unsurfaced roads, but winter haul may occur on some private lands. Current baseline conditions for assessing water quality standards take into account sediment inputs ongoing non-federal timber harvest which has been steadily ongoing in these sub-watersheds, and the rate at which these operations would occur is not expected to increase. Current sediment inputs, though likely to be reducing the quality of localized aquatic habitat conditions, must be within Oregon water quality standards under the Oregon Forest Practices Act. BMPs reduce erosion and sedimentation from road building, reconstruction, maintenance, and use related to the Westside project, the Middle Cow Landscape project, the Screen Pass Timber Sale, and other ongoing federal young stand management and fuels projects to be within the expected effects analyzed under the Medford RMP. BMPs were designed to ensure that federal projects meet water quality standards. As a result, sediment delivered to streams would not be expected to be measurable above the current baseline conditions at the single HUC 6 sub-watershed scale, the planning area, or the larger HUC 5 scale when all past, present, and potential future activities within any of these watersheds are considered.

Density management and fuels treatments would occur in this Planning Area on up to an additional 500 acres, as part of the Young Stand Management Plan and fuels reduction projects (BLM-Glendale Resource Area). These operations are expected to occur within the next 1-5 years. The Middle Cow Landscape Project is also proposing 1,236 acres of density management and fuels treatments on approximately 2,501 acres of upland and riparian reserve acres within the Quines Creek sub-watershed. The Westside project would add approximately 990 acres (under both Alternative 2 and 3) fuels treatments. Density management and fuels treatments can have a minimal short term negative effect to soils as a result of changes in nutrient distribution and abundance, and in isolated areas where erosion occurs (generally less than ¼ acre), but these treatments are generally beneficial to the productivity of the stand in the long term by reducing competition, and by increasing stand diversity and stand health. These treatments also considerably reduce the risk of a catastrophic wildfire, which would otherwise cause a long term loss of soil organisms from deep heating of the soil, and an increase in erosion resulting from dry ravel and rilling. Because BMPs and burn plans would be followed, short term impacts would be within those analyzed for under the Medford RMP, and erosion would not be expected to move off-site because large organic ground cover would remain on site and soils would not be excessively heated, thus maintaining much of their adhesive properties.

Timber yarding activities that increase open space are expected to result in a short term increase the amount of erosion that would occur within this Planning Area. Where vegetation and downed organics still remain, much of this erosion is expected to be stored on site and within the EPZ vegetation where it is present. Where this is not the case, all logged sites must be planted within 3 years under OFPR, and many sites are often planted sooner. Once vegetation has re-established on a site, generally within 3-6 years, the amount of erosion that moves off site is drastically reduced, decreasing the amount of soil mobilized off-site.

Because they are hydrologically connected to streams, roads, and areas where recent clearcut logging on non-federal land extends into the riparian areas, would likely contribute nearly all of the erosion related sediment to the streams and waterways. Erosion coming from all activities within this Planning Area would be expected to pulse during winter months when streams and rainfall are highest, and would therefore be expected to remain within the ODEQ water quality standards (see 3.4.2.2, Alternative 2), when measured at the HUC 6 or project scale. However at the HUC 7, or smaller, scale where peak flows are causing increased channel scour, it would be expected that there would be a localized reduction in aquatic habitat for several winters until streambanks re-stabilize. There would likely also be a localized increase in the percentage of fines immediately downstream of streamside logging operations on non-federal lands, for several winters until the site re-vegetates, due to increased surface runoff. This may affect local headwater tributary macroinvertebrate populations, but would not be detectable in water quality at the HUC 6, Planning Area or HUC 5 scale. Riparian Reserve buffers and Ecological Protection Zones would be expected to capture most sediment resulting from upslope harvest activities on Federal lands, including yarding and road erosion. Road maintenance activities would mitigate some chronic erosion by improving road surfaces and road drainage prior to use. Road decommissioning under Westside would also reduce some chronic sediment sources as discussed above. Due to the amount of area affected relative to the Planning Area, the past, current, and future rates at which activities occur within this planning area, and the trend toward increased environmental protections and improved yarding techniques on both federal and non-federal operations in the past 30 years, it would be expected that there would be no measurable increase or decrease in the sediment budget as a result of any recent past, present, or known future projects, at the Planning Area scale or larger, within these HUC 6 sub-watersheds.

Both the Westside and Middle Cow projects have been designed following the BMPs which were designed to minimize the effects to water quality in such a way that all state water quality standards are met under all proposed alternatives. Federal NFP aquatic conservation strategy objectives would also be met under all alternatives at the HUC 5 scale. This project's benefits to the riparian reserves, including the acceleration of large woody debris and multistory canopy stands, would improve the long term water quality and aquatic habitat conditions. In the long term, road maintenance, blocking, mulching and seeding, and decommissioning activities would improve aquatic health by reducing chronic sediment problems. Though these effects would be beneficial to species and water quality at the HUC 7 scale or smaller, it would not be measurable in the long term on the project scale due to the limited acres of riparian treatments and the small number of effective road miles eliminated.

Because there were no measurable effects found at the HUC 6 or larger scale, there would also be no measurable effects from this project at the HUC 5 scale

Cumulative Effects to Fisheries

See cumulative effects discussion above for ongoing and future BLM and private projects within the Planning Area.

Areas of localized sediment input would occur as a result of the timber harvest activities and road related activities proposed under Alternative 2 and 3. There would be no cumulative effects to fish habitat (including Bureau sensitive Oregon Coast Coho and Oregon Coast Steelhead) from timber harvest and road related activities at the HUC 6 or HUC 5 watersheds. When added to non-federal actions the localized effects (HUC 7) from the potential increase of sediment from peak flow enhancement to fish habitat (including Bureau sensitive Oregon Coast Coho and Oregon Coast Steelhead) in Wood Creek would not be seen at the HUC 6 or HUC 5 scale. These cumulative effects are within the scope of anticipated effects to aquatic resources determined in the RMP EIS (pages 4-66).

Following the road maintenance, renovation, and culvert replacements proposed under Alternative 2 and 3 there would be less sediment entering streams and less risk of mass failures. Future sediment levels in fish habitat would be lower; however, several roads adjacent to and crossing streams would remain. Therefore, some streams would have areas of sediment reduction however such reductions would be immeasurable at the HUC 6 or HUC 5 watersheds. These cumulative effects are within the scope of anticipated effects to aquatic resources determined in the RMP EIS (pages 4-66). The Roseburg BLM would be hauling and conducting road renovation activities within the Fortune Branch HUC 7 watershed, as proposed within the Screen Pass Timber Sale in the Revised Can-Can Regeneration Harvest Plan EA. The Roseburg BLM analyzed the effects of the haul on Fortune Branch and concluded:

> The haul route parallels Fortune Branch (Medford District, BLM) and crosses a single perennial stream at two locations. Harvest and hauling for the Screen Pass timber sale would be restricted to the dry season when little potential exists for mobilizing or moving fine sediment from road surfaces into drainage systems and thence into streams (Revised Can-Can Regeneration Harvest Plan EA OR 105-05-06).

The Roseburg BLM haul and road renovation on Fortune Branch, when combined with the Westside Project activities and effects disclosed above, would not result in negative cumulative effects to fish habitat in the Fortune Branch HUC 7 watershed or the Quines HUC 6 watershed because 1) the Roseburg BLM would not conduct winter haul in the Fortune Branch watershed, 2) the road renovation is not within close proximity to fish habitat in Fortune Branch, 3) road 35-5-17.0, which parallels fish habitat in Fortune Branch, is a gravel road in good condition, and 4) as stated in the Revised Can-Can EA, little potential exists for mobilizing or moving fine sediment from road surfaces into drainage systems and thence into streams.

A higher number of riparian reserves throughout the Planning Area would be more resilient to high intensity fires. Thinning within riparian reserves would provide more LWD for streams sooner than if untreated. This would be a net beneficial cumulative affect to fish habitat.

3.4.5 Essential Fish Habitat

Alternative 1 (No Action)
Effects to EFH under Alternative 1 (No Action) are consistent with those discussed in the Fisheries section under Alternative 1. See section 3.4.3.2 for this discussion.

Alternative 2 (Proposed Action)

Water Quality
The bridge replacement which would occur over EFH in Windy Creek might use treated wood planks for a portion of the surface. The rest of the bridge would be constructed with steel. Substantial changes to water quality at the site level are not anticipated to occur as a result of using treated wood, however there is a small potential for minimal adverse effects to EFH to occur as a result of chemicals leaching out from the treated wood. The adverse affects would be minimal and would be mitigated by the following measures and design criteria:

- All provisions of the Clean Water Act and DEQ's provisions for maintenance of water quality standards would be followed.
- The entire bridge would not be constructed of wood, only a few planks to cover the running surface. These boards would not come into direct contact with the water.
- Toxic substances would not be introduced above natural background levels in waters of the state in amounts which may be harmful to aquatic life.

Riparian Reserve protection zones on all streams would provide adequate shade to streams and thus maintain stream temperatures. Harvest and fuels reduction treatments within riparian reserves would encourage the development of old-growth forest characteristics, including the growth of large trees which may provide higher quantities of large diameter wood to streams. The addition of LWD to the stream would benefit EFH by trapping sediment and therefore maintaining cool stream temperatures.

Peak Flows *(Much of the following was taken from section 3.2.1 Soils and 3.2.2 Water Resources. Some language from those sections was brought forward to the EFH section for better understanding of the potential effects to EFH.)*

HUC 7 Discussion

As discussed under watershed hydrology, increased open space within some HUC 7's could potentially increase peak flows resulting in localized areas of channel instability and an increase in the amount of sediment originating from these headwater streams. Within the 0306, 0324, 0409, 0418, and 0421 HUC 7 basins, channel scour could potentially occur during and immediately following storm flow events. As a result of the increase in peak flows which could occur under Alternative 2, a minimal increase in turbidity and sediment deposition could be seen at the HUC 7 scale within some tributary streams of Windy Creek and Fortune Branch during the first winter and during high flow events.

0409, 0324 and 0306 HUC 7
Increased stream energy or sediment loads within the 0409, 0324 and 0306 drainages would be diluted to the point of being negligible upon entering larger stream reaches where EFH is present.

In the Windy Creek 0409 HUC 7 TSZ, there are about 30 acres proposed for RH/OR. This would increase open space within the TSZ from about 36% open space to 41% open space. Approximately 33% of this watershed is within the TSZ and the watershed as a whole would remain under 25% open condition. As a result, any impacts to the stream channel would be expected to be localized in the tributaries and upper reaches of Lawson Creek where a majority of the past and current open space conditions in this watershed would be situated. These effects would not be expected to be measurable in EFH habitat approximately ½ mile downstream in the lower portions of this drainage. Within basin 0409, there are currently no signs of increased channel scour on BLM land below the headwaters of the most highly impacted area. This basin currently has about 20% open space overall and a road density of approximately 2.4mi/mi^2 (or 1%), there has been little disturbance between the TSZ open space and the streams below. As a result, it would be expected most of the additional flow generated as a result of TSZ openings is being reabsorbed into the vegetated landscape below, and is not resulting in increased peak flows or sediment input to stream channels. Because there are no mapped streams within any of these disturbed acres, and the riparian zones on the streams below are generally in good condition with larger trees and established streamside vegetation in the headwater tributaries there would be little chance of stream bank scour occurring as a result of increased flows within this watershed.

0418 and 0421 HUC 7
As discussed in the Soils (3.2.1) and Water Resources (3.2.2) the 0418 HUC 7 basin presently has a degraded baseline condition which is likely already effecting the watershed hydrology, stream channel, and water quality within Wood Creek and its tributaries. Over 2/3 of the acres in the Windy Creek HUC 6 proposed for RH/OR harvest under this alternative, would occur in the lower portion of this watershed within two HUC 7 basins (0418 and 0421). The existing condition of these two basins, and the amount of open space within these TSZ's, increases the potential of additional impacts causing measurable effects to the channel structure and sediment loads within these Windy Creek tributaries. Additional activity within either the 0421 or 0418 HUC 7 basins would contribute to, and potentially increase the impacts occurring in these stream channels.

It would be expected upper reaches of Deeds Creek (within 0421 HUC 7) are currently being affected by increased peak flows and water yields. This could potentially be contributing to the moderate channel scour currently occurring within these headwater tributaries. However, I surveys of these areas were not done before this area was harvested so it is not conclusive as to the cause of this localized channel scour. Neither Deeds Creek nor any other streams within the 0421 HUC 7 have EFH present within them. Because of increased channel size and the reduced gradient of the mainstem of Windy Creek, the limited contributing area of Deeds Creek HUC 7 drainage (17%), and because the soils within this watershed are moderately cohesive, any impacts resulting from increased peak flows within this watershed would not be expected to cause measurable impacts to the channel structure, water quality, or EFH within the mainstem of Windy Creek at the mouth of this watershed. Increased stream energy or sediment loads within the 0421 HUC 7 drainage would be diluted to the point of being negligible upon entering the larger Windy Creek where EFH is present.

The major stream within the 0418 HUC 7 is Wood Creek, which has EFH high up in the system. Because of the proposed increased openings within the TSZ of this HUC 7, when added to the current amount of openings, there is a potential for an increase in peak flows to occur in Wood Creek. An increase in peak flows has the potential to lead to channel instability (including bank erosion) and an increase in sediment input at the site level. Depending on the magnitude of the increase in peak flow, there is a potential for the channel instability (including bank erosion) and an increase in sediment input to adversely affect EFH. Based on the conclusions reached in section 3.4.2 Water Resources from a potential increase in peak flows, potential effects to EFH can be explored. While the potential channel erosion and increased sediment could have an adverse affect on EFH, it would not substantially alter EFH within Wood Creek. The effect would be a minimal reduction in quality of EFH. The increased peak flows could potentially result in localized effects of in channel erosion. In other words, channel erosion would not be expected to occur along entire stretches of streams, but rather short discontinuous sections. Small pockets of sediment, resulting from an increase in peak flows, may be deposited in Wood Creek. These small sediment depositions within habitat units (pools, riffles, etc.) would not remove the ability of fish to use those habitat units for carrying out activities such as spawning, rearing or holding. Even in light of a potential minor reduction in quality of EFH, sufficient habitat within Wood Creek would remain available under Alternative 2 for fish to carry out life cycles. The potential for an increase in peak flows would be reduced because full Northwest Forest Plan riparian reserve buffers would be retained within regeneration or overstory removal units. In addition, there are no regeneration or overstory reduction units adjacent to EFH in Wood Creek.

HUC 6 Discussion
Alternative 2 would result in approximately 1440 additional acres (3.9%) of open space. At the HUC 6 scale, this would not be expected to cause additional hydrologic or geomorphic changes above the current baseline conditions within this Planning Area, due to hydrologic recovery and larger basin sizes. As shown in Table 3-8 and Table 3-9 in section 3.4.1.1, approximately 26% (years 1974 – 1989) of these acres are currently at, or approaching, an advanced stage of hydrologic recovery, within the Windy Creek HUC 6, with up to 36%

nearing advanced recovery stages in the TSZ. This recovery would be expected to be causing a reduction in any effects which may be occurring as a result of open space. Because of this, the relativity low percentage of road acres within this watershed, and because the watershed is currently just 3% above the point at where research indicates hydrologic effects may become measurable, it was determined the increased erosion from peak flow and timing impacts within this watershed would be minimal and immeasurable at the HUC 6 level.

For the Fortune Branch HUC 6 and Windy Creek HUC 6 sub-watersheds, Alternative 2 would increase open space to approximately 28% and 32% respectively, raising them above the recommended 25% for potentially seeing detectable increases in peak flows and water yields. However, these are relatively large watersheds, and studies have shown increases in peak flow are generally less, or undetectable within these larger basins (Church and Eaton, 2001). Additionally, these watersheds have a relatively low percentage of existing road acres. Research indicates roads are the most critical impact to a watershed in regards to hydrology and peak flow changes (See section 3.4.6 Applicable Research). The addition of 10 acres of road in Fortune Branch HUC 6, and 6 acres in Windy Creek, would still keep road acres in these watersheds well below the 3-4% where measurable increases in peak flows may be seen (Bowling and Lettenmaier, 1997). As a result it would be unlikely to see any measurable increase or decrease in flows, water yields, or hydrologic timing would be seen as a result of this project within the large streams in these watersheds.

Stream bank erosion at the HUC 6 scale within Windy Creek below the Wood Creek confluence is not apparent. This is likely a result of the much larger channel capacity of Windy Creek, and because this HUC 7 watershed only accounts for about 25% of Windy Creeks total contributing drainage area. Additionally it was determined the increased sediment input within Wood Creek as a result of current peak flow enhancements, is likely being deposited within the debris and other channel structures throughout Wood Creek, and is intermittently becoming suspended and transported through the system during periods of high flow. Since there is approximately 1.7 miles between where these affected headwaters enter Wood Creek, and the confluence of Wood Creek and Windy Creek it would be unlikely this additional sediment is causing a measurable increase in sediment loads within Windy Creek, especially given the contributing drainage area of this basin. As such, it does not appear these effects are currently resulting in a measurable impact to beneficial uses at the HUC 6 level

Because 56% of the acreage contributing to the flows in Windy Creek occurs above the junction of 0421 and 0418 HUC 7 watersheds, any increased stream energy or sediment loads within these HUC 7 watersheds would be diluted to the point of being negligible upon entering the mainstem of Windy Creek. Therefore, it would not be expected for any activity associated with this project to cause a measurable difference in the timing or magnitude of the peak flows, or by extension, in the quantity of ground water storage at the HUC 6 scale. Therefore any impacts resulting from increased peak flows within the 0418 HUC 7 would not be expected to cause measurable impacts to the channel structure, water quality, or fish habitat within the mainstem of Windy Creek at the mouth of this watershed, at the HUC 6 level.

The Quines Creek HUC 6 sub-watershed would remain under 25% open space under Alternative 2, and road acres would continue to be relatively low. Therefore it would be unlikely, when comparing these impacts to experiments in the HJ Andrews, Casper Creek, and others (Church and Eaton, 2001), to see any considerable changes, on a HUC 6 scale, in the peak flows, water yield, low flows, or hydrologic timing within the Quines Creek HUC 6 watershed, as a result of Alternative 2. Both HUC 7 basins included within this Planning Area would also remain below 25% open space and only 0.2 acres of additional roads are proposed. As a result it would not be expected for any hydrologic changes to occur at the HUC 7 scale within the Quines Creek sub-watershed either.

Because these impacts would be dispersed over the Windy Creek, Fortune Branch, and Quines Creek HUC 6 sub-watersheds, which encompass over 47,700 acres, and because these activities would all be done using BMPs and PDFs designed to reduce erosion and limit off-site transport of erosion, as described under Erosion in Alternative 2 (Section 3.2.1.2), there would be no resulting impacts to fisheries at the HUC 6 level from this action.

Peak Flow Conclusion
Several studies have shown the first storms of the fall season have the most increase in peak flow from pre-logging conditions (Rothacher 1973, Harr el al. 1975, Harr, et al. 1979, Ziemer 1981). These fall storms are small and geomorphically inconsequential (Harr 1976). Studies on increased peak flows are varied in their findings on how much increase in flow would result from a given amount of timber harvest. Most studies agree effects of harvest treatment decreases as the flow event size increases (Rothacher 1971, Rothacher 1973, Write et al. 1990) and is not detectable for flows with a two year return interval or greater (Harr et al 1975, Ziemer 1981, Thomas and Megahan 2001).

Stormflow response of small basins is affected primarily by hillslope processes, which are sensitive to management activities. Stormflow response of larger basins is governed primarily by the geomorphology of the channel network, which is less likely to be affected by management activities (Robinson et al 1995). Also, runoff response time is generally shorter for small watersheds when compared to larger watersheds, and runoff per unit area is higher. As small streams form increasingly larger drainage networks, the ability of individual small watersheds to affect flow decreases (Garbrecht 1991). As a result, peak flow increases following harvesting or other forest practices in small watersheds, where proposed timber harvest units for this action are located, are typically immeasurable in larger streams (Beschta, et al, 1995, Adams and Ringer 1994).

According to the Watershed Hydrology section, increased open space within five HUC 7's could potentially increase peak flows resulting in localized areas of channel instability and increase in the amount of sediment originating from these headwater streams. There however, would be no adverse effect to EFH from four of the HUC 7's because it would be expected for any increased stream energy or sediment loads within these tributaries to be diluted to the point of being negligible upon entering larger reaches where EFH is present.

EFH in Wood Creek, which is located within the 0418 HUC 7, would be adversely effected by an increase in peak flows, therefore causing channel instability (including bed and bank erosion) and an increase in sediment at the site level. These impacts however would be immeasurable at the HUC 6 level. The channel instability and increased sediment would not however, substantially alter EFH within Wood Creek rather the effect would be a minor reduction in quality of EFH. The increased peak flows would result in localized effects of in stream erosion. However, even in light of a potential reduction in quality and quantity of EFH, sufficient EFH within this HUC 7 would remain available under Alternative 2 for salmon to carry out life cycles. Full Northwest Forest Plan riparian reserve buffers would be retained within regeneration or overstory removal units. In addition, there are no regeneration or overstory reduction units adjacent to EFH in Wood Creek. Therefore, adverse effects to EFH would be minimal within the Wood Creek HUC 7.

Sediment

There would be a minimal adverse effect on EFH in Wood Creek due to sediment increases from peak flows, at the site level, as indicated above

The effect of road related activities on the generation of fine sediment to streams is included in the Watershed Hydrology section of this document. If sediment is delivered to streams from road activities, it would potentially be delivered to fish-bearing reaches and might disturb habitat quality and use for fish. Approximately 9 draw culverts are proposed for replacement which may contribute sediment to EFH. Draw culvert replacement is a function of road maintenance. Six of the culverts are within the Fortune Branch HUC 7 (0306). The other three are within the Windy Creek HUC 7 (0403). The Fortune Branch culverts are all located on intermittent streams. Two of the three culverts on Windy Creek are perennial. All culverts would likely be replaced within the first year of the project. The temporary stream crossing would cause a small amount of disturbed soil, with the potential for a small amount of sediment to enter the stream channel. There is an expected localized, minimal, short term increase in sediment which would affect EFH during the first winter. PDFs would mitigate sediment at the site level following the first winter. It is during the first winter rain storms in which most of the exposed soil from road maintenance is mobilized, transported down the ditches and enters stream channels. In addition, road maintenance and decommissioning would reduce chronic erosion problems and have the overall effect of reduced input of sediment to streams.

Riparian Reserve protection zones on all streams would filter out any sediment derived from harvest and yarding activities from being transported overland. Riparian Reserves would also protect stream bank stability. Best Management Practices and Project Design Features would reduce the contribution impacts of road related activities, and harvest and fuel reduction treatments to sediment potentially affecting EFH.

LWD

Harvest and fuels reduction treatments located within the riparian reserves adjacent to commercial thinning units would help to improve the quality of EFH by reducing stand densities, allowing for the development of larger diameter trees faster. There would be a positive effect on EFH by enhancing the quality and expediting the development of potential LWD over the long term. These treatments would also reduce the potential spread of tree diseases, such as insect infestation and root diseases. Root disease includes, but are not limited to, Armillaria and laminated root rot. The treatments would also reduce the risk of a large scale fire occurring which could negatively affect EFH by removing portions of the shade canopy and causing increased soil erosion and temperature increases.

The increase in peak flows within the 0418 HUC 7 would not be expected to increase flows to a point which would remove or relocate LWD within Wood Creek or any other tributary within the 0418 HUC 7.

Pools
Riparian treatments for harvest and fuels reduction would expedite the development of potential LWD recruitment. An increase of large wood in the stream because of riparian reserve management would increase the amount and quality pools and benefit EFH.

The increase in peak flows within the 0418 HUC 7 would not be expected to result in a change in quality or quantity of pools within the 0418 HUC 7.

Conclusion for Alternative 2
Activities associated with Alternative 2 would have a minimal adverse effect on EFH. Effects would include minor sediment deposition resulting from road related activities, such as road renovation including culvert replacements, road maintenance and road decommissioning. Long term beneficial effects from proposed road maintenance would be realized under this alternative. Minor improvements to salmon spawning success, aquatic insect production and gravel permeability would result because of road maintenance activities.

Peak flows and the resulting sediment impacts would have a minimal adverse effect on EFH. From the discussion above, it was determined EFH within one HUC 7 would be affected (Wood Creek within 0418 HUC 7). Potential effects include channel instability and increased erosion. Increases in peak flows would not be to the extent to cause a change in the amount and location of LWD or the quality or quantity of pools. Effects from peak flow increases would not be seen in EFH within larger HUC 6 streams. Due to these key points, the increased peak flows would result in minimal adverse effects to EFH.

Riparian Reserve protection zones would maintain stream temperatures and aid in the stability of stream banks, and filter out sediment derived from harvest and yarding.

Harvest and fuels reduction treatments within Riparian Reserves would promote growth of large trees faster, increasing potential LWD, maintaining stream temperatures, and increasing quality and quantity of pools.

Adverse effects would be localized and short term, and would be minimized by implementing appropriate BMPs and PDFs in accordance with the Northwest Forest Plan and the Medford District RMP ROD.

Alternative 3

Peak Flows
Alternative 3 would not be expected to result in localized peak flow increase and would not cause an increase in bank erosion and subsequent sediment input to stream channels.

Localized increases in water yields above current levels may still occur within the Fortune Branch 0306 and 0324 basins and the Windy Creek 0418 and 0421 basins as a result of harvesting which would occur outside the TSZ. This is because these watersheds would be harvested above 25% of the entire basin, which research has shown to result in increased water yields (Church and Eaton, 2001).

In the TSZ, RH/OR harvesting is being proposed in Fortune Branch on 138 acres, and to access these acres an additional 6 acres of temporary roads and up to 4 acres of helicopter landings would be built. This would increase open space by 148 acres (7%) for a total of 26% open space within the TSZ of this HUC 6.

Under this alternative, the TSZ RH/OR units located within the Windy Creek HUC 6 watershed would either be deferred or the harvest prescription would change to maintain a minimum of 30% canopy closure. Canopy closure above 30% is considered to be the minimum cover necessary to eliminate units from contributing peak flow enhancements (WPN, 1999). Baseline conditions in the TSZ within Windy Creek HUC 6 currently exceed 25% in open space. Within Windy Creek HUC 6 there would be no increase in open space within the TSZ.

In Quines Creek 83 acres of harvest, 1 acre of helicopter landing construction, and .2 miles of road construction would increase open space by about 85 acres (1%) for a total of about 23% open space in the TSZ of Quines Creek.

By changing these prescriptions and strategically deferring some units, the risk of increased peak flows expected to cause in-channel erosion within several HUC 7 watersheds under Alternative 2, would be largely eliminated. This would be expected to eliminate all measurable effects to water quality and stream habitat. In conclusion, the measures proposed under Alternative 3 would be expected to eliminate all measurable effects to water quality and stream habitat. Alternative 3 would not be expected to result in localized peak flow enhancement within the tributary headwaters of these watersheds, and would not cause channel instability. Under Alternative 3, potential degradation of EFH would likely be immeasurable as there would not be any regeneration harvesting and overstory removal within the TSZ of HUC 7 basins with baseline conditions exceeding recommended amounts of open space, therefore adverse effects to EFH would not be expected

<u>Sediment</u>
Potential sediment sources from peak flow increases resulting from creating open space within TSZ would be eliminated under Alternative 3.

The amount of sediment reaching the stream channel under this alternative due to road related activities would be the same as those described under Alternative 2. Short term, minimal adverse effects to EFH would be expected from road related activities. PDFs would mitigate potential effects. Following the first winter the amount of sediment entering stream would be immeasurable. Road maintenance and decommissioning would generally reduce chronic erosion problems and, thus, have an overall effect of reduced input of sediment to streams and improved fish habitat.

All other affects to EFH are the same as those described above for Alternative 2.

Conclusion for Alternative 3

Activities associated with Alternative 3 would have a ***minimal adverse effect*** on EFH. The effect would be the result of minor sediment deposition caused by road related activities, such as road maintenance which includes culvert replacements and road decommissioning. Long term beneficial effects from proposed road maintenance would be realized under this alternative as some chronic sediment sources within the Planning Area would be alleviated. Minor improvements to salmon spawning success, aquatic insect production and gravel permeability would result because of road maintenance activities.

Riparian reserve protection zones would maintain stream temperatures and stream bank stability, and filter out any sediment derived from harvest and yarding. Harvest and fuels reduction treatments within Riparian Reserves would promote growth of large trees faster, increasing potential LWD, maintaining stream temperatures, and increasing quality and quantity of pools.

Adverse effects would be localized and short term, and would be minimized by implementing appropriate BMPs and PDFs in accordance with the Northwest Forest Plan and the Medford District RMP ROD.

Cumulative Effects to EFH

The proposed action of this project when added to past, present, and reasonably foreseeable future actions would result in no cumulative effect on EFH. There would be no negative cumulative effect to EFH from harvesting because adverse affects from increases in peak flows would be immeasurable at the HUC 6 or HUC 5 scale. Road maintenance would result in beneficial cumulative effects to EFH because water drainage on roads would be improved.

The proposed action of this project when added to past, present, and reasonably foreseeable future actions would result in no cumulative effect on EFH. There would be no negative cumulative effect to EFH from harvesting because adverse affects from increases in peak flows would be immeasurable at the HUC 6 or HUC 5 scale. Road maintenance would result in beneficial cumulative effects to EFH because water drainage on roads would be improved.

The Roseburg BLM would be hauling and conducting road renovation activities within the Fortune Branch HUC 7 watershed, as proposed within the Screen Pass Timber Sale in the

Revised Can-Can Regeneration Harvest Plan EA. The Roseburg BLM analyzed the effects of the haul on Fortune Branch and concluded:

The haul route parallels Fortune Branch (Medford District, BLM) and crosses a single perennial stream at two locations. Harvest and hauling for the Screen Pass timber sale would be restricted to the dry season when little potential exists for mobilizing or moving fine sediment from road surfaces into drainage systems and thence into streams (Revised Can-Can Regeneration Harvest Plan EA OR 105-05-06)

The Roseburg BLM haul and road renovation on Fortune Branch, when combined with the Westside Project activities and effects disclosed above, would not result in negative cumulative effects to EFH in the Fortune Branch HUC 7 watershed or the Quines HUC 6 watershed because 1) the Roseburg BLM would not conduct winter haul in the Fortune Branch watershed, 2) the road renovation is not within close proximity to EFH in Fortune Branch, 3) road 35-5-17.0, which parallels EFH in Fortune Branch, is a gravel road in good condition, and 4) as stated in the Revised Can-Can EA, little potential exists for mobilizing or moving fine sediment from road surfaces into drainage systems and thence into streams.

Harvest and fuels reduction treatments within the riparian reserves may help reduce the potential of large scale disease or fire and thus positively alter EFH by maintaining shade canopy, future LWD recruitment, and preventing soil erosion.

EFH Conservation Measures

The following conservation measures have been incorporated into the project and would minimize potential adverse effects to EFH. These measures would be incorporated into Alternative 2 and 3.

- PDFs
- BMPs
- Full Northwest Forest Plan riparian reserve buffer widths within regeneration and overstory removal treatment units.

Utilization of ecological protection zone buffers for other commercial thinning

3.6 Mitigation Measures

Mitigation measures were developed in response to some specific public comments to allow the decision maker to evaluate the effects if those measures were taken. They differ from PDFs in that they are not restrictions but a subset decision point under any of the alternatives. Mitigation is defined as: *1/ avoiding the impact altogether by not taking a certain action or parts of an action; 2/ minimizing impacts by limiting the degree or magnitude of the action and its implementation; 3/ rectifying the impact by repairing, rehabilitating, or restoring the affected environment; 4/ reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and 5/ compensating for the impact by replacing or providing substitute resources or environments*.

3.6.1 Mitigation #1

This mitigation measures considers the effects of deferring harvest units in either Alternative 2 or 3 that would remove or downgrade critical habitat. This deferred treatment that removed and/or downgraded suitable habitat with CHU OR-32. Those units deferred include: #4-20, 4-24, 4-4, 3-19, 3-5, 3-5A, 33-2A, 33-2B, 4-20S, 5-7S, and 31-3 (RH or OR) and # 4-8, 3-8, 3-10, 3-11, 4-21S, 4-3S, 4-19S, 4-20SA, 5-9S, 5-10S, 5-21S, 5-5S, 31-8 (commercial thinning).

3.6.1.1 Environmental Effects to Fire Risk and Hazard

Applying Mitigation 1 under Alternative 2, there would be 238 less acres of RH and OR post harvest slash and 381 acres of post harvest CT slash. Under Alternative 3, there would be 198 less acres of RH and OR post harvest slash and 367 acres of post harvest CT slash These effects would not exceed the findings found under the Fire Risk and Hazard section of the Westside EA, Section 3.2.

3.6.1.2 Environmental Effects to NSO Critical Habitat

Alternatives 2 and 3

Mitigation 1 would have the same affect as analyzed under Alternative 1 (No Action) found in section 3.3.2.2 of this EA for the removal and downgrade of NSO critical habitat. There would be little impact on late-successional and old-growth forest associated species in the Critical Habitat Unit at this time.

3.6.1.2 Environmental Effects to Soils, Hydrology and Fisheries

Implementing this mitigation measure would result in a decrease in surface erosion from yarding corridors on 577 acres within the Planning Area. In Fortune Branch HUC 6, the deferral of 367 acres of CT and 210 acres of RH/OR harvest would suspend the need for yarding disturbance to occur on about 41 acres, compaction on approximately 28 acres, and productivity losses equal to about 21 acres. Additionally temporary road construction needed to access units 3-5, 3-5a, 4-8, 4-33, and 4-20S would not be needed eliminating the immediate need to construct and decommission about 0.5 miles of road. These reductions in erosion would reduce the amount of sediment that would potentially be transported to the streams, but would not be expected to measurably alter alter project-related sediment from entering streams. Proposed open space would decrease by 210 acres, but would not amend potential channel erosion from peak flow and water yield enhancements, as a result of the watersheds in which these acres are located. Minor productivity losses from treating 577 acres of timber slash would also be suspended. The slight increase in risk of mass wasting as a result of a contact zone within unit 33-2 would also be temporarily eliminated.

3.6.1.3 Environmental Effects to Essential Fish Habitat

The purpose of mitigating measure #1 was to minimize effects to northern spotted owl critical habitat. The effects to EFH would be the same as those analyzed above under Alternatives 2 and 3.

3.6.2 Mitigation #2

Mitigation Measure #2 would be a decision point under the selected alternative. This mitigation measure would limit the helicopter harvesting of unit 21-8 from September 10 to October 5. It was developed after concerns from the adjacent Fir Point Bible Conferences camp about the amount of helicopter logging noise from either Alternative 2 or 3 in harvesting this unit. The Fir Point Christian retreat is located in T 32S, R 6W, section 21. The retreat has 100 individuals per week from June 19 - August 25. These individuals primarily stay from Monday thru Friday each week with no one using the retreat on the weekends during this period. From August 26 - June 18 the retreat is booked every weekend from Friday thru Sunday. Most of the retreaters are youth and they participate in outdoor and indoor recreation activities as well as an hour-long church service a couple of times a day. The retreat is also booked each year from October 5-15.

3.6.1.1 Environmental Effects to Other Resources.

Other Resources would not be affected if this mitigation measure was implemented. The main effect is the practical and economic feasibility of helicopter yarding unit 21-8 under the limited window of September 10 to October 5. The use of helicopters is based on their availability and operating window. Costs are known to increase when the operation season is restricted.

Chapter 4.0 List of Preparers

The following individuals participated on the interdisciplinary team or were consulted in the preparation of this EA:

Name	Title	Primary Responsibility
Michael Bornstein	Wildlife Biologist	Wildlife, T/E Animals
Sarah Bickford	Forester	Logging Systems
Colleen Dulin	Hydrologist	Soils, Hydrology
Dave Eichamer	Forester	Special Products
Martin Lew	Ecosystem Planner	Team Leader, NEPA coordinator, writer
Stephanie Messerle	Fish Biologist	Essential Fish Habitat and Fisheries
Chris Prentis	Silviculturist	Silviculture
Rachel Showalter	Botanist	Botany, Noxious Weeds, T/E Plants
Amy Sobiech	Archaeologist	Cultural Resources, Native American Coordinator
Donni Vogel	Fuels Specialist	Fire Risk and Hazard, Air Quality
Katie Wetzel	Recreation Planner	Visual Quality, Recreation
Dustin Wharton	Engineer	Transportation

Chapter 5.0 Public Involvement and Consultation

5.1 Public Scoping and Notification

5.1.1 Public Scoping

Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea. Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 32 public responses from either letters or emails. Responses to public scoping comments are found in Appendix 3. Comments were also considered in the development of the alternatives. The Glendale Resource Area also accepts public comment of proposed forest management activities through the quarterly BLM Medford Messenger publication. A brief description of proposed projects, such as Westside, a legal location and general vicinity map are provided along with a comment sheet for public responses. The Westside Project was included in these quarterly publications beginning in fall, 2004.

5.1.2 30-day Public Comment Period

The Environmental Assessment will be made available for a 30-day public review period. Notification of the comment period will include: the publication of a legal notice in the Daily Courier, newspaper of Grants Pass, Oregon; and a letter to be mailed to those individuals, organizations, and agencies that have requested to be involved in the environmental planning and decision making processes for proposed timber sales. Comments received in the Glendale Resource Area Office, 2164 NE Spalding Ave. Grants Pass, Oregon 97526 on or before the end of the 30-day comment period will be considered in making the final decision for this project.

5.2 Consultation

5.2.1 United States Fish and Wildlife Service

In accordance with regulations pursuant to Section 7 of the Endangered Species Act 1973, as amended, re-consultation with the USFWS concerning the potential impacts of implementing the Westside Project upon the northern spotted owl has been completed under Biological Opinion (log # 1-15-06-F-0162).

5.2.2 National Marine Fisheries Service

Informal or formal consultation under the Endangered Species Act with NMFS would not be necessary as there are no listed species within the portion of the Planning Area within the Umpqua Basin. The road maintenance and hauling activities which would occur within the Rogue Basin and the range of the federally threatened Southern Oregon Northern California coho salmon were determined to have no effect on coho or critical habitat.

Consultation as required under the Magnuson-Stevens Fishery Conservation and Management Act for adverse affects on Essential Fish Habitat has been completed .

5.2.3 State Historical Preservation Office

The State Historical Preservation Office approved the clearance/tracking form for the Westside Timber Sale. The form is contained within the Westside Analysis file.

ACRONYMS AND GLOSSARY

Abbreviations:

BLM	Bureau of Land Management
BMP(s)	Best Management Practices
CT	Commercial Thinning
DBH	Diameter at Breast Height
ESA	Endangered Species Act
GS	Group Select
NEPA	National Environmental Policy Act
PDF	Project Design Feature
RH	Regeneration Harvest
SC	Selection Cut

Air Quality. Refers to standards for various classes of land as designated by the Clean Air Act, P.L. 88-206, Jan. 1978.

Backfiring operations are used during indirect attack and are implemented by intentionally setting fire to fuels inside the control line in order to slow down the wildfire by consuming the fuels in advance of the wildfire (NWCG, 1994).

Best Management Practices (BMP). Practices determined by the resource professional to be the most effective and practicable means of preventing or reducing the amount of water pollution generated by non-point sources; used to meet water quality goals (See Appendix D in RMP (USDI BLM 1995)).

Biomass utilization (as considered under this project). Wood (< 16 inches dbh of non-saw logs) or woody fiber by-products that result from forest and woodland restoration, thinning activities, and fuel treatments to be applied towards bio-energy use and/or products manufactured from material such as posts, poles, and firewood.

Canopy. The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand.

Coarse Woody Debris. Portion of trees that have fallen or been cut and left in the woods. Usually refers to pieces at least 20 inches in diameter.

Commercial Thinning. The removal of merchantable trees from most often an even-aged stand to encourage growth of the remaining trees.

Compaction (relative to this EIS). Refers to soil becoming consolidated by the effects of surface pressure often from heavy machinery or vehicle and pedestrian traffic.

Cover. Vegetation used by wildlife for protection from predators, or to mitigate weather conditions, or to reproduce. May also refer to the protection of the soil and the shading provided to herbs and forbs by vegetation.

Cultural Resources. The physical remains of human activity (artifacts, ruins, burial mounds, petroglyphs, etc.) having scientific, prehistoric or social values.

Cumulative Effect. The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can also result from individually minor, but collectively significant actions taking place over a period of time.

Diameter at Breast Height (dbh). The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

Direct attack is a method of fire suppression in which treatments are applied directly to burning fuel, such as wetting or smothering, in order to limit the amount of oxygen available to the flame, or by constructing fireline for the purpose of removing available fuels (NWCG 2005).

Edge. Where different plant communities meet, or where variations in successional stage or vegetation conditions within the plant community come together.

Effects (or Impacts). Environmental consequences as a result of a proposed action. Effects provide the scientific and analytical basis for comparison of alternatives. Effects might be either direct (caused by the action and occur at the same time and place) or indirect (occurring later in time or at a different location, but are reasonably foreseeable or cumulative results of the action).

Effects and impacts as used in this EA are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or healthy effects, whether direct, indirect, or cumulative. Effects might also include those resulting from actions that might have both beneficial and detrimental effects, even if on the balance it appears that the effects would be beneficial.

Endangered Species. Any species defined through the Endangered Species Act of 1973 as amended, as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA). A statement of the environmental effects of a proposed action and alternatives to it. It is required for major federal actions under Section 102 of NEPA and is released to the public and other agencies for comment and review. It is a formal document that must follow the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the project proposal.

Erosion. Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is more rapid than normal, natural, or geologic erosion, primarily resulting from the activities of people, animals, or natural catastrophes.

Fire intensity is the rate of heat energy released during combustion per unit length of fire front, measured in British Thermal Units (Btu) per foot per second (NWCG 1994).

Fire return interval is the number of years between two successive fire events for a given area (NIFC-B, 2006).

Fire Severity

Low- Less than 75% of the dominant overstory vegetation is replaced
Mixed- Combination of Low and High severity in patches
High- More than 75% of the dominant overstory vegetation is replaced

Flame length is the distance measured from the tip of the flame to the middle of the flaming zone at the base of the fire. It is measured on a slant when the flames are tilted due to effects of wind and slope (NWCG, 1994).

Floodplain. The lowland and relatively flat area adjoining inland and coastal waters, including, at a minimum, areas that are subject to a one percent or greater chance of flooding in any given year.

Forage. All browse and non-woody plants that are available to livestock or game animals and used for grazing or harvested for feeding.

Forest canopy is defined as the stratum containing the crowns of the tallest vegetation present in the stand, usually above 20 feet in height (NWCG, 1994).

Forest Health. The ability of forest ecosystems to remain productive, resilient, and stable over time and to withstand the effects of periodic natural or human caused stresses such as drought, insect attack, disease, climatic change, flood, resource management practices and resource demands.

Forb. Any herb other than grass.

Fuels. Combustible wildland vegetative materials present in the forest which potentially contribute to a significant fire hazard.

Fuel load is the measure of the amount of fuel in a given area, generally expressed in tons per acre (NWCG, 1994).

Fuels Management. Manipulation or reduction of fuels to meet Forest protection and management objectives while preserving and enhancing environmental quality.

Habitat Type. (Vegetative). An aggregation of all land areas potentially capable of producing similar plant communities at climax.

Hardwoods. A conventional term for broadleaf trees and their wood products.

Impacts. A spatial or temporal change in the environment caused by human activity**.** See effects.

Indirect attack is a method of fire suppression in which the fireline is located a considerable distance away from the fire's active edge. Generally employed in the case of fast moving or high intensity fire. The fuel between the control line and the fire's edge is usually backfired, but occasionally the main fire is allowed to burn up to the fireline, depending on conditions (NWCG 2005).

Indirect Effects. Secondary effects which occur in locations other than the initial action or significantly later in time.

Intermittent Stream. Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Mitigation. Mitigation includes (1) avoiding the impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (5) compensating for the impact by replacing or providing substitute resources or environments.

National Environmental Policy Act of 1969 (NEPA). This law requires the preparation of environmental impact statements for every major Federal Action which causes a significant effect on the quality of the human environment.

No-Action Alternative. The No-Action Alternative is required by regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1502.14). The No-Action Alternative provides a baseline for estimating the effects of other alternatives. When a proposed activity is being evaluated, the No-Action Alternative discusses conditions under which current management direction would continue unchanged.
Non-attainment. Failure of a geographical area to attain or maintain compliance with ambient air quality standards.

Noxious Weeds. Rapidly spreading plants that can cause a variety of major ecological or economic impacts to both agriculture and wildland.

Overstory. That portion of trees which form the uppermost layer in a forest stand which consists of more than one distinct layer (canopy).

Perennial Streams. Streams that flow continuously throughout the year.

Prescribed Burning. The intentional application of fire to wildland fuels in either their natural or altered state. Burning is conducted under such conditions as to allow the fire to be confined to a predetermined area and to produce an intensity of heat and rate of spread required to meet planned objectives (e.g., silvicultural, wildlife management, reduction of fuel hazard, etc.).

Prescribed Fire. A preplanned wildland fire burning under specified conditions to accomplish specific planned objectives. It could result from either a planned or unplanned ignition.

Prescription. Management practices selected and scheduled for application on a designated area to attain specific goals and objectives.

Rate of spread (ROS) is the speed at which the fire is advancing and is influenced by wind, slope, and the fuel type through which it is burning. ROS is usually measured in chains per hour (one chain equals 66 feet).

Regeneration. The renewal of a tree crop, whether by natural or artificial means. This term might also refer to the crop itself(seedlings, saplings).

Resource Management Plan (RMP). A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act. (See USDI, BLM 1995).

Riparian Reserves. Designated riparian areas found outside Late-Successional reserves.

Riparian Zone/Habitat. Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Reconstruction. replacing, rebuilding, or restoring an improvement facility or treatment (i.e., fence, spring development, cattleguard, road, trail, building, parking lot, etc.) to its original or modified condition.

Road Maintenance. The work required to keep a facility (road) in such a condition that it may be continuously utilized at its original or designed capacity and efficiency, and for its intended purposes.

Seral Stages. The series of relatively transitory plant communities that develop during ecological succession from bare ground to the climax stage. Generally there are five stages recognized: early-seral, mid-seral, late-seral, mature-seral, and old-growth.

Slash. The residue on the ground following felling and other silvicultural operations and/or accumulating there as a result of a storm, fire girdling, or poisoning of trees.

Snag. A standing dead tree usually without merchantable value for timber products, but having characteristics of benefit to cavity nesting wildlife species.

Soil Compaction. An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads, vibration, or pressure.

Stand. A community of trees or other vegetation uniform in composition, physiognomy, spatial arrangement, or condition to be distinguishable from adjacent communities.

Threatened Species. Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and which has been designated in the Federal Register as such. In addition, some states have declared certain species in their jurisdiction as threatened or endangered.

Understory. Vegetation (trees or shrubs) growing under the canopy formed by taller trees.

Water Quality. The chemical, physical and biological characteristics of water.

Watershed. Entire area that contributes water to a drainage system or stream.

Wildfire. Any wildfire not designated and managed as a prescribed fire with an approved prescription.

Yarding. The act or process of moving logs to a landing.

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APPENDIX 1 ALTERNATIVE DEVELOPMENT SUMMARY

Environmental Assessment Number OR-118-05-021

Pursuant to Section 102 (2) (E) of NEPA (National Environmental Policy Act of 1969, as amended), Federal agencies shall "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The CEQ (Council on Environmental Quality) regulations for implementing the procedural provisions of NEPA states, alternatives should be "reasonable" and "provide a clear basis for choice" (40 CFR 1502.14).

In light of the direction contained in both NEPA and the CEQ Regulations, the following questions were used to 1/ identify the alternatives to be analyzed in detail in this environmental assessment that are in addition to the "Proposed Action" and "No Action" alternatives, and 2/ document the rationale for eliminating alternatives from detailed study.

1. **Are there any unresolved conflicts concerning alternative uses of available resources?** *If yes, document and go to Question #2. If no, document rationale and stop evaluation*

   Yes. *Hydrologic cumulative effects resulting from private logging, checkerboard ownership and recent BLM actions may defer timbered stands a period of time to allow the watershed to recover (WA, p. 61).*

   The Westside interdisciplinary team considered research that suggests that peak flow changes are not measurable when less than 25% of the watershed is clearcut. Peak flow effects diminish as the stands grow generally considered to be in an advanced stage of hydrologic recovery 20 years after disturbance, and substantially complete by age 30 (Harr, 1989; Adams and Ringer, 1994). Though the BLM no longer clearcuts, open space in excess of 25% was considered a trigger point for further analysis of the potential for increased peak flows, especially in instances where more than 25% of the transient snow zone (TSZ) is also in open condition. TSZ openings can independently result in excessive surface and channel erosion within a watershed when the TSZ acres occupy a majority of the watershed, or where open acres are concentrated within the headwaters of a particular stream network.

   No. The following alternatives were considered but eliminated from further consideration**:**

   a) *The Glendale RA should refrain from logging mature and old-growth forest and thin plantations instead.*

The purpose and need of the EA clearly addresses the issue by stating that for sustained yield the Medford ROD/RMP assumed an average annual harvest of 1,140 acres of regeneration harvest (RH) and overstory removal (OR) the first decade (ROD/RMP. p, 9). However, the actual amount offered for sale on the Medford District from 1995 to 2004 fell far below this amount, as it was less than 500 acres of regeneration harvest and overstory removal per year. The RMP identified regeneration and overstory removal as the primary method of harvest on northern General Forest Management Area ((NGFMA), RMP, p 187). Commercial thinning is not a sustainable method of harvest but produces timber and is appropriate where stands are overstocked and to assure high levels of volume productivity.

The need for harvest treatments in the Westside Planning Area is to meet the NGFMA direction in the Medford RMP/ROD of providing a sustainable supply of timber that would trend toward a forest composed of stands containing a variety of structures, ages, sizes, and canopy configurations generally through the even-aged management silvicultural system (RMP, p. 187). Where appropriate the modified regeneration silvicultural treatments would occur at a minimum 100 years of age (RMP, p. 74).

The Middle Cow Creek Watershed Analysis (WA, p. 35) estimated that 58% of northern GFMA lands within this area are mature and older stands. Approximately 39% of the older stands are over 200 years of age. Individual stands currently have an all aged structure developed as a result of past disturbances such as natural fire or partial cut harvesting. The desired landscape on NGFMA lands within the Westside Planning Area is a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66). The WA (p. 36) states that "[t}here are currently 13,248 acres of late-successional habitat within established reserves, representing 29 percent of the federal forest lands… This indicates that even if all the GFMA lands were logged, there would still be more than the required 15 percent of the federal forest lands in the watershed in a late-successional habitat condition."

b) *Include an alternative that uses helicopter.* Helicopter yarding is used instead of tractor or cable yarding methods for such reasons as limited access due the high cost of building roads or risk of sedimentation from mid-slope road building. The Purpose and Need of the project states that "Applying modified regeneration silvicultural treatments at a minimum of 100 years of age (RMP, p. 74). This age level is sustainable and would meet economic and logging-practicality requirements." The costs for helicopter logging are much higher than conventional harvesting systems. The appraisal costs for helicopter yarding with the Boeing BV-234 is $5,400 an hour with a consumption of 405 gallons of jet fuel an hour. A heavy helicopter such as a Boeing BV-234 can lift up to 10,000 pounds and would be needed for trees with over 1,000 pounds (greater than 24 inches DBH). A small heavy helicopter such as a K-Max can lift up to 5,000 pounds and can be used for logs less than 1,000 pound (less than 24 inches DBH). Move in costs would be approximately $10,000 per ship.

As an example the appraisal cost of helicopter yarding came out to $302/mbf, the cost for cable yarding system came out to $139/mbf on the Willy Slide Timber Sale.

c) *WA states that "A higher level of connectivity should be maintained along the north and south ridges to promote east-west movement of species" (WA, p.69)*

Connectivity facilitates movement and genetic exchange among individuals of species. The Northwest Forest Plan Final Environmental Impact Statement (NFP FSEIS, pp. 3 &4-38-3&4-44) discusses the assumed outcomes regarding connectivity. The NFP considered the issue of connectivity and developed a system of reserves, connectivity blocks and 100 acre owl core areas. The NFP acknowledged that there was a 66% likelihood of achieving very strong and strong outcomes for connectivity during the first 100 years. This occurs primarily because 100 years is not long enough for cutover landscapes to return to late-successional conditions that approximate prelogging conditions. Many late-successional attributes require 200 to 500 years to develop. None of the 9 alternatives analyzed under the NFP achieved a likelihood of 80% in the Klamath Province, in which Westside is located. It was noted that the NFP reverses the pattern of timber harvest on federal lands over the last 50 years (NFP FSEIS., p. 3&4-45). The Medford RMP EIS identified the concern for this east-west swath and stated in the analysis that "[h]abitat loss in these areas due to past logging could have already resulted in a significant loss of connectivity between physiographic provinces and consequent reproductive isolation" (p. 4-75).

While the Watershed Analysis recommended maintaining a higher level of connectivity the Westside Project interdisciplinary team determined that the northern ridge does not provide a continuous west to east band of federal land because of heavily harvested private lands to the west, intermingled land ownership and the I-5 corridor, which forms a barrier, and runs north to south at the eastern edge of the Planning Area. The southern ridge also has the same barriers to the west to east movement of species because of intermingled private land and the I-5 corridor. There is more opportunity for spotted owl movement along the southern ridge as it contains a large block of critical owl habitat.

The Middle Cow Creek Watershed Analysis states that "these recommendations are not to be considered for future management actions…They should not be viewed by the public, BLM staff or managers as a commitment or as binding on future management. Watershed analysis is clearly not a decision document" (WA. p.65). Any specialist recommendation in the watershed analysis is considered with the larger landscape analysis done through the Northwest Forest Plan and consultation with the US Fish and Wildlife Service and the subsequent Biological Opinion.

d) *We ask the Glendale Resource Area to consider an alternative that best meets the recommendations to make "an aggressive effort" to reduce road densities in the watershed.*

While the Purpose and Need for the Westside Project states that this project was not being developed as a restoration project to reduce road densities, open road density was considered in the harvest transportation system. After harvest is completed decommissioning 0.74 miles of existing roads would have a net decrease of .25 miles under the Proposed Action.

Most of the roads within the Westside Planning Area are not public roads and are under reciprocal right-of-way agreements with private landowners because of the checkerboard ownership pattern. The BLM does not have the option to close these roads.

2. **What alternatives should be considered that would lessen or eliminate the "unresolved conflicts concerning alternative uses of available resources"?** *List alternatives and go to Question #3. If no alternative is identified other than the "no action" alternative, document and stop evaluation.*

   One alternative was considered that would eliminate the unresolved conflict regarding the risk of increases of peak flows in the transient snow zone. Under Alternative 3, all RH/OR units located within the TSZ HUC 6 sub-watersheds, where baseline conditions currently exceed 25%, would be deferred, or the harvest prescription changed to maintain a minimum of 30% canopy. Though the BLM no longer clearcuts, open space (stands with less than 30% canopy cover) in excess of 25% was considered a trigger point for future analysis of the potential for increased peak flows, especially in instances where more than 25% of the TSZ is also in open condition.

3. **Of those alternatives identified in Question #2, are there reasonable alternatives for wholly or partially satisfying the need for the proposed action?** *If so, briefly describe alternatives and go to question #4. If no, document rationale and stop evaluation.*

   Yes, Alternative 3 identified in Question #2 would partially meet the purpose and need of meeting the Oregon and California Revested Lands Sustained Yield Management Act (O & C Act) which requires the Secretary of the Interior to manage O & C lands for permanent forest production in accord with sustained yield principles (RMP, p.17) and the desired landscape of a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66).

4. **Of those alternatives identified in Question #3, will such alternatives have meaningful differences in environmental effects?** *If so, seek line officer approval*

to carry alternatives forward for detailed analysis in the environmental assessment. If no, document rationale and stop evaluation.

Yes. See Chapter 3 of the EA (impact analysis for Alternative 3)

APPENDIX 2 ENVIRONMENTAL ELEMENTS CRITICAL REVIEW

Environmental Assessment Number OR-118-05-021

In accordance with law, regulation, executive order and policy, the interdisciplinary team reviewed the elements of the human environment to determine if they would be affected by the alternatives described in Chapter 2 of the EA (environmental assessment). The following three tables summarize the results of that review. Those elements that are determined to be "affected" will define the scope of environmental concern, Chapter 3 of the EA.

Table 1. Critical Elements of the Environment. This table lists the critical elements of the human environment (BLM Handbook 1790-1) which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary teams predicted environmental impact per element if Alternatives 2 or 3 described in Chapter 2 of the Environmental Assessment were implemented.

Critical Element of the Human Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Air Quality (Clean Air Act)	Not Affected	Activity and hazardous fuels would be burned in accordance with the Oregon Smoke Management Plan administered by the Oregon Department of Forestry and the regulations established by the Oregon Department of Environmental Quality. The Planning Area is not located within a Class I designated airshed or non-attainment area. The impact of smoke on air quality is expected to be localized and of short duration. Particulate matter would not be of a magnitude to harm human health, affect the environment, or result in property damage. Dust created from vehicle traffic on gravel or natural-surfaced roads, road construction, and logging operations would be localized and of short duration. As such, the Proposed Action is consistent with the provisions of the Federal Clean Air Act.
Areas of Critical Environmental Concern	Not Present	There are no Areas of Critical Environmental Concern located within the Planning Area.
Cultural, Historic, Paleontological	Not Affected	Cultural resource surveys were completed for the project in winter of 2005. Guidelines for the survey followed compliance procedures for cultural resource survey set forth by Section 106 National Historic Preservation Act (NHPA). Surveys were conducted using Oregon State Historical Preservation Office (SHPO) standards protocol. Cultural surveys revealed some cultural sites.

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Critical Element of the Human Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Cultural, Historic, Paleontological	Not Affected	Cultural sites are any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value. All recorded sites located in units would be protected using Project Design Features such as a no cut buffer. As such, cultural resources would not be affected. If cultural resources are located during the implementation of an action, the project would be redesigned to protect the values present or until an evaluation can occur based on recommendations from the Glendale Resource Area archaeologist with concurrence from the State Historic Preservation Office. All such sites would be evaluated and protected by the BLM under the following Federal laws: Federal Land Policy and Management Act of 1976, National Historic Preservation Act (Section 106) of 1966, Antiquities Act of 1906, Archaeological Resource Protection Act of 1979, Reservoir Salvage Act of 1960, American Indian Religious Freedom Act of 1978, National Environmental Policy Act of 1960, and Native American Graves Protection and Repatriation Act of 1990.
Energy (Executive Order 13212)	Not Affected	The Proposed Action would have no effect on energy development, production, supply and/or distribution
Environmental Justice (Executive Order 12898)	Not Affected	The Proposed Action is not anticipated to have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
Prime or Unique Farm Lands	Not Present	There are no prime or unique farmlands within the Planning Area.
Flood Plains (Executive Order 11988)	Not Affected	The Proposed Action does not involve occupancy and modification of floodplains, and would not increase the risk of flood loss. As such, the Proposed Action is consistent with Executive Order 11988.
Hazardous or Solid Wastes	Not Affected	There would be no environmental effects associated with this element due to the implementation of the Best Management Practices contained in the Medford RMP and the terms/conditions of the timber sale contract.
Invasive, Nonnative Species (Executive Order 13112)	Not Affected	Units with the Westside Planning Area were surveyed for noxious weeds in the spring of 2004 and 2005. The Planning Area is known to have noxious weeds along many roadsides, and 10 populations of *Cirsium arvense* (Canada thistle), 5 populations of *Cirsium vulgare* (Bull thistle), 9 populations of *Cytisus scoparius* (Scotchbroom), 14 populations of *Rubus discolor* (Himalayan blackberry), 1 population of *Senecio jacobaea* (Tansy ragwort), 1 population of *Chondrilla juncea* (Rush Skeleton weed), and 10 populations of *Centaurea pratensis* (aka *C. debeauxii*) (Meadow knapweed) were documented within or directly adjacent to proposed units

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Invasive, Nonnative Species (Executive Order 13112)	Not Affected	The Medford District RMP states that the objectives for noxious weeds are to “contain and/or reduce noxious weed infestations on BLM-administered land.(p. 92),” and “survey BLM-administered land for noxious weed infestations…(p. 93).” These RMP directions for weed management are intended to be met at a landscape level. In an effort to continue to contain and/or reduce noxious weeds on federal land, the BLM proposed to treat known weed populations within the Glendale Resource Area, including the Westside Planning Area, under an agreement with the Douglas County Soil and Water Conservation District, using Title II funds obtained in 2004. There are three main reasons why potential weed establishment is not expected to result in a detectable effect to overall ecosystem health. First, surveys indicate that a very small percentage - less than 1% of acreage within the Planning Area units - are affected by noxious weeds. Second, these sites located in units proposed for treatment have been reported during predisturbance surveys, and are proposed for weed treatment under Medford District’s *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14* Third, Project Design Features (PDFs) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources. Seeds are spread by the wind, by animal/avian vectors, natural events, and by human activities - in particular through soil attachment to vehicles. BLM’s influence over these causes of the spread of noxious weeds is limited to those caused by human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weed establishment, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds, it may only reduce the risk or rate of spread. See noxious weed specialist report in Appendix 8.
Native American Religious Concerns	Not Affected	Native American groups were contacted and no concerns were identified by these groups.
T/E (Threatened or Endangered) Fish Species or Habitat	Not Affected (Southern Oregon/Northern California coho salmon Evolutionarily Significant Unit (ESU))	Salmon are listed under the Endangered Species Act by ESUs. An ESU is a stock of Pacific salmon that is 1) substantially reproductively isolated from other specific populations units; and 2) represents an important component in the evolutionary legacy of the species. The northern most extent of the federally listed threatened Southern Oregon/Northern California (SO/NC) coho salmon ESU is the Rogue River Basin. SO/NC coho salmon are not located within the watersheds with proposed vegetation management activities.

Table 1. Critical Elements of the Environment. This table lists the critical elements of the human environment (BLM Handbook 1790-1) which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary teams predicted environmental impact per element if Alternatives 2 or 3 described in Chapter 2 of the Environmental Assessment were implemented.		
Critical Element of the Human Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure to describe environmental impacts, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
T/E (Threatened or Endangered) Fish Species or Habitat	Not Affected (Southern Oregon/Northern California coho salmon Evolutionarily Significant Unit (ESU))	Only road maintenance and haul would occur within the Rogue River Basin, in which SO/NC coho salmon are found. Salmon are listed under the Endangered Species Act by ESUs. An ESU is a stock of Pacific salmon that is 1) substantially reproductively isolated from other specific populations units; and 2) represents an important component in the evolutionary legacy of the species. The northern most extent of the federally listed threatened Southern Oregon/Northern California (SO/NC) coho salmon ESU is the Rogue River Basin. SO/NC coho salmon are not located within the watersheds with proposed vegetation management activities. Only road maintenance and haul would occur within the Rogue River Basin, in which SO/NC coho salmon are found. There are no federally listed threatened or endangered fish species located within the Windy Creek, Fortune Branch, and Quines Creek HUC 6 watersheds or the Middle Cow Creek HUC 5 watershed. The 6.2 miles of road maintenance and haul proposed within the Rogue River Basin would have no effect on SO/NC coho salmon or coho critical habitat (CCH). These roads have been recently maintained (2003-2004) by grading, rocking, and replacement of 90% of the draw culverts. CCH is more than 300 feet away from the closest aggregate road. The closest perennial stream crossing from coho is more than 0.4 miles away. With well vegetated ditch lines, properly functioning cross drains, and existing filter strips, sediment has no mechanism for delivery to coho streams or CCH.
T/E (Threatened or Endangered) Plant Species or Habitat	Not Present	Of the four federally listed plants on the Medford District (*Fritillaria gentneri*, *Limnanthes flocossa* ssp. *grandiflora*, *Arabis macdonaldiana*, and *Lomatium cookie)* only *Fritillaria gentneri* has a range and habitat which extends into the Glendale Resource Area. Although a few units of the Westside Planning Area are within the range and habitat of *F. gentneri*, as determined by the US Fish and Wildlife Service, vascular plant surveys were conducted in the spring of 2004 and 2005, and no *Fritillaria gentneri* populations were found. There would be no anticipated effect from the proposed action on any federally listed plant.

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T/E (Threatened or Endangered) Wildlife Species, Habitat and/or Designated Critical Habitat	Affected (NSO - species and its habitat,; Fisher - habitat) Affected (NSO critical habitat) Not Affected Disturbance-NSO, Bald Eagle Not Present (MAMU, including habitat)	Affected: Alternatives 2 and 3 would impact suitable habitat for the NSO (northern spotted owl), Threatened, and Pacific fisher (Candidate). The unit of measure is the acres of suitable habitat downgraded or removed. *Refer to Section 3.4 of the EA for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.* Affected: Alternatives 2 and 3 would affect NSO critical habitat within the Planning Area, including the primary constituent elements that support nesting, roosting, foraging, and dispersal. The unit of measure is the acres of suitable or dispersal habitat downgraded, removed, or degraded. Not Affected: Logging activities occurring during spotted owl nesting season are not expected to disturb owls within ¼ mile of nesting habitat (PDFs, Section 2.3.9.1). Bald eagles are known to occur along Cow Creek near the confluence with Quines Creek. No treatments are planned in this area. Seasonal logging restrictions would be applied to protect known bald eagles and spotted owl sites to avoid disturbance from noise. Not Present: Marbled murrelets are not present within the Planning Area. Suitable marbled murrelet habitat is considered to occur up to 10km east of the hemlock zone. The entire Planning Area occurs outside (east) of this zone. The proposed action would not occur within designated marbled murrelet critical habitat.

Table 1. Critical Elements of the Environment. This table lists the critical elements of the human environment (BLM Handbook 1790-1) which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary teams predicted environmental impact per element if Alternatives 2 or 3 described in Chapter 2 of the Environmental Assessment were implemented.		
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Water Quality (Surface and Ground)	Not Affected: Temperature & Chemical/Nutrient Contamination	Streams in the Planning Area are generally well shaded on public lands. Where thinning occurs within the riparian zone, it would be outside the 60 foot wide primary shade zone, which research has shown to be effective in maintaining stream temperature when the secondary shade zone does not reduce the canopy by more than 50%. The secondary shade zone exists at least partially within the area designated as the Ecological Protection Zone. The EPZ is a variable width buffer (between 75-160 feet in this Planning Area) where no commercial harvest would occur and stand management would maintain a minimum of 50% canopy closure. Out side this buffer a minimum 40% canopy closure or greater would be maintained, as needed to promote the development of LS characteristics within the riparian reserves. These buffers have been designated based on slope and soil, and are expected to maintain riparian microclimate conditions and protect streams from further increases in temperature. Riparian vegetation would not be removed adjacent to regeneration harvest units to reduce the possibility of windthrow, or edge effects to the riparian microclimate, and to provide movement corridors for wildlife movement and refuge. See Section 2.3.7 “Streams and Riparian Zones” for design features used to ensure stream temperature would be maintained or improved in accordance with ACS objectives. A total of 31.6 miles of stream are listed on the DEQ 303(d) list for exceeding water temperature standards within this Planning Area. .This includes approximately 9.4 miles on Windy Creek (5% federal ownership), 4.7 miles on Fortune Branch Creek (75% federal ownership), 4 miles on Wood Creek (1% federal ownership), 3.5 miles on Woodford Creek (10% federal ownership), and 10 miles of Cow Creek (5% federal ownership). This is not expected to change because non-federal ownership provides a lower level of protection to riparian areas along these streams that often does not allow for optimal shade conditions to be achieved. BLM lands would continue to be managed to attain compliance with state water quality standards and ACS objectives. No herbicides or pesticides would be used in conjunction with this project. Hydraulic fluid and fuel lines on heavy mechanized equipment would be in proper working condition in order to minimize potential for leakage into streams. No re-fueling of any equipment would occur within 150ft of streams or stream crossings and re-fueling would be done on compacted surfaces such as roads or landings, and absorbent materials would be required to be on-site to allow for immediate containment of any accidental spills. Due to these design features it would not be expected for the proposed action to have any affect on chemical contamination of streams or waterbodies. Fuels treatments could increase nitrogen levels within the stream and riparian zone in the short term. These would be highly localized, low level increases and would not be expected to be of a magnitude that would have any adverse effect macroinvertebrate populations which are the most sensitive indicators of water quality conditions.

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Water Quality (Surface and Ground) - Continued	Affected: Sediment/ Turbidity	There are no known groundwater aquifers in the Planning Area. The proposed action would result in erosion from log haul roads, tractor, cable, and helicopter yarding corridors, road building (and decommissioning of temporary roads after use), the renovation of helicopter landings, and from decommissioning of existing roads. It would be expected that this erosion would result in a short term affect on water quality immediately downstream of some sites, but would not be detectable at the HUC 6 scale or larger. Open space created by RH/OR within the TSZ of certain watersheds could result in localized sedimentation that could effect water quality and fish habitat in small tributary streams. A bridge replacement project over Windy Creek and several draw culvert upgrades would also result in a short term increase in localized sediment. Four units are proposed for downhill yarding under this project which BMPs suggest avoiding for water quality protection. Downhill yarding typically results in more impacts than typical yarding corridors would create. However, downhill yarding was proposed in these units as the least impactive option for timber management, when compared to the poor placement options for road entry, and/or the very long and infeasible yarding corridors that would have to be used for uphill yarding, and since these units all occur more than ¼ mile from a stream, which would generally allow for all detectable amounts of sediment that became mobilized, to become trapped within the vegetation prior to entering the waterways, and yarding activities would be mitigated by water-barring, seeded and mulching following harvest to prevent gullying. Therefore these units would not be expected to contribute increased amounts of sediment to the streams. Together erosion from this project would not be expected to cause sedimentation to streams that would be in excess of the Environmental Protection Agency’s criteria for surface water quality standards under 304 a(1) of the Clean Water Act or the State of Oregon, because PDFs would limit the amount of erosion, and subsequent sedimentation to streams at the project level (HUC 5 & 6). The decommissioning of .9 miles of actively eroding road, along a fish stream, would be expected to cause an improvement to water quality within Fortune Branch Creek in the long term. The unit of measure is a narrative (Section 3.4).

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Wetlands (Executive Order 11990)	Not Affected	All known wetlands in this Planning Area are less than one acre in size and thus not subject to E.O. 11990. However, all preexisting wetlands under 1 acre, and any wetlands that may be discovered during project implementation, would be buffered, as required by the Medford RMP, to ensure protection of all ecological functions. It is not expected that any wetlands in excess of 1 acre would be found, due to aerial photo examinations, and field verifications that have already occurred in this planning area. Therefore the proposed action would not result in the destruction, loss or degradation of any wetland. As such, the proposed action is consistent with Executive Order 11990.
Wild and Scenic Rivers	Not Present	
Wilderness	Not Present	

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Essential Fish Habitat (Magnuson-Stevens Fisheries Conservation and Management Act)	Affected (EFH within the Middle Cow Creek HUC 5 watershed) Not Affected (EFH within the Rogue River Basin)	Some streams within this Planning Area are designated as EFH (Essential Fish Habitat) under the Magnuson-Stevens Fishery Conservation and Management Act. The Proposed Action may cause minimal adverse effects to some sections of EFH within the Middle Cow Creek HUC 5 watershed. *Refer to Section 3.4.5 of the EA for a discussion of effects of the alternatives related to this element of the environment.* The unit of measure is impact that reduces the quality and quantity of EFH leading to consultation with NMFS for "Adverse Affect." The 6.2 miles of road maintenance and haul would have no effect on EFH in the Rogue River basin. These roads have been recently maintained (2003-2004) by grading, rocking, and replacement of 90% of the draw culverts. EFH is more than 300 feet away from the closest aggregate road. The closest perennial stream crossing from EFH is more than 0.4 miles away. With well vegetated ditch lines, properly functioning cross drains, and existing filter strips, sediment has no mechanism for delivery to EFH. Project actions would follow all provisions of the Clean Water Act (40 CFR Subchapter D) and DEQ's provisions for maintenance of water quality standards.
Fire Hazard/Risk	Affected	New permanent road construction has the potential to increase fire risk. Hazardous fuel treatments would reduce fire hazard in the long term while the CT prescriptions could increase fire hazard in the short term. Flame length is the unit of measure for fire hazard. The unit of measure for fire risk is a narrative on the probability of fire ignition.. *Refer to Section* 3.2 *of the EA for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
Recreation	Not Affected	There are no developed BLM recreation sites on public lands in the Planning Area. Recreation opportunities in the Planning Area include an Oregon Department of Forestry Park located along Windy Creek, two Department of Transportation Rest Stops located along Interstate 5, a small number of dispersed seasonal hunting camps, and a City Park in Glendale. Recreation activities in the Planning Area include driving for pleasure, hiking, camping, hunting, OHV use, horseback riding, and bicycling. While there might be increased logging truck traffic during the operational months, this type of activity is typical for the area because of harvesting on private and other government owned lands.
Rural Interface Areas (RMP, Map 13)	Not Affected	Rural residents abide in the Planning Area would experience short-term noise, dust, and traffic congestion due to logging operations. These types of activities are common because of management practices occurring on private and other public lands. Concerns such as dust abatement, traffic congestion, and helicopter flight noise would be mitigated through the application of Project Design Features addressed in Chapter 2 of this document.
Special Areas (not including ACEC)	Not Present	There are no ACECs within the Planning Area and ACECs would not be affected.

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Survey & Manage and Special Status Species (not including T/E): Fish Species/Habitat	Not Present Survey & Manage Fish Species	There are no Survey and Manage fish species listed in the *Final Supplemental Environmental Impact Statement and Record of Decision and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and* Guidelines (FSEIS, 2000 and ROD, 2001) including any amendments or modifications in effect as of March 21, 2004. Fish species are listed as special status species by ESUs. See the "T/E (Threatened or Endangered) Fish Species or Habitat" section above for the definition of ESUs.
	Affected (Oregon Coast coho salmon ESU)	Affected (Oregon Coast Coho): Alternative 2 and 3 may affect channel stability and sediment in streams and therefore affect Oregon Coast coho, a Bureau Sensitive Species... The unit of measure is whether the action would contribute to the need to list the species as a result of habitat alteration. *Refer to chapter 3 of the EA for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
	Affected (Oregon Coast steelhead ESU)	Affected (Oregon Coast Steelhead): Alternative 2 and 3 may affect channel stability and sediment in streams and therefore affect Oregon Coast steelhead, a Bureau Sensitive Species. The unit of measure is whether the action would contribute to the need to list the species as a result of habitat alteration. *Refer to Section 3.5 of the EA for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.*
	No management requirement: Pacific lamprey and Oregon coastal cutthroat trout	Pacific lamprey and Oregon coastal cutthroat trout, Bureau Tracking species, are also found within the Planning Area. Bureau Tracking species are not considered special status species for management purposes. These species do not require management or mitigation (IM OR-2003-054). Because of the Project Design Features which includes the Best Management Practices within the RMP, the amount of sediment reaching fish habitat from the proposed action (timber harvest, road work, and fish habitat enhancement) would be minimal, short term and localized. As such, potential impacts to these species from proposed activities would not adversely affect the populations and result in the need to list under the Endangered Species Act.

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Survey & Manage and Special Status Species (not including T/E): Fish Species/Habitat - Continued	Not Affected Special Status Species within the Rogue River Basin	Not Affected (Special Status Species within the Rogue River Basin): The 6.2 miles of road maintenance and haul proposed within the Rogue River basin would not affect any special status species found within the Rogue River basin. Species include Southern Oregon Coast/California Coast fall chinook (sensitive) and Southern Oregon Coast/California Coast spring chinook (assessment). Summer and Winter Klamath Mountain Province (KMP) steelhead are Bureau Assessment. Fall chinook are located approximately 8 miles downstream from the proposed haul roads within the Rogue River Basin. Spring chinook are located approximately 19 miles downstream from the proposed haul roads within the Rogue River Basin. The proximity of the proposed haul roads in the Rogue River Basin to spring and fall chinook is such that any sediment created on the roads would not reach spring or fall chinook. Sediment from road maintenance and hauling would not effect steelhead in Wolf Creek because the road is gravel, the distance from the stream crossings to steelhead, and the PDFs for road maintenance and haul to reduce sediment from entering streams. Summer and winter KMP steelhead are located in Wolf Creek. The closest road to KMP steelhead is road 33-5-10. This road crosses two intermittent tributaries, which flow approximately 325 feet and 0.23 miles before entering Wolf Creek. Southern Oregon/Northern California coast cutthroat and Pacific lamprey within the Rogue Basin are bureau tracking and would not be affected populations and result in the need to list under the Endangered Species Act.
Special Status Species (not including T/E): Plant Species/Habitat	Not Affected	**Bureau Special Status Plants – PRESENT, NOT AFFECTED** Vascular plant surveys were conducted in the spring of 2004 and 2005, and surveys were completed in the spring of 2005 for lichens and bryophytes. Surveys revealed 5 bureau special status vascular plant sights and 11 Survey and Manage vascular plant sites: 4 sensitive species sites (4 *Limnanthes gracilis var. gracilis*), 1 assessment species site (*Clarkia heterandra*), and 11 S&M Category C sights (4 *Cypripedium fasciculatum* and 7 *Cypripedium montanum*)(Table 1-1). Three bureau tracking species sites (1 *Enemion stipitatum*, and 2 *Mimulus douglasii)* were also documented during pre-disturbance surveys.

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Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Affected	Nonvascular surveys, completed in spring 2005, resulted in 3 new bureau special status nonvascular plant sites, all of which are Assessment species (2 *Funaria muhlenbergii* and 1 *Crumia latifolia*). Seventy-nine tracking species sites (*29 Chaenotheca ferruginea, 11 Chaenotheca furfuracea, 1 Chaenotheca subroscida, 1 Hedwigia detonsa, 4 Leptogium rivale, 6 Sarcosoma latahense, 6 Plectania milleri, 2 Fissidens pauperculus,* and 19 *Gelatinodiscus flavidus*) were also documented. Four of these tracking species also have Survey and Manage status; *Chaenotheca ferruginea* and *Gelatinodiscus flavidus* are Category B species, and *Chaenotheca subroscida* and *Leptogium rivale* are Category E species. Within timber harvest units, bureau sensitive and assessment species and survey and manage category C species would be protected by buffers, which would vary in diameter depending on unit prescription. Bureau tracking species do not require mitigation, and would not receive buffers. However, sites harboring tracking species which also have a S&M Category B or E designation would be managed. *C. ferruginea* and *C. subroscida* sites within units retaining more than 40% canopy closure would be managed by leaving their substrates intact. Per contractor reports, many of the *C. ferruginea* sites were noted to occur in close proximity (within 200-400 feet) to openings, indicating this species can persist in habitats with increased amounts of light. This finding was considered in the preparation of management recommendations of the Glendale Resource area Botanist, since no official management recommendations have been established. Those *C. ferruginea* sites within units retaining less than 40% canopy closure would be managed by substrate retention coupled with a 25 – 40 foot buffer to maintain the microhabitat. *Gelatinodiscus. flavidus* and *L. rivale* sites would be managed by buffers similar to those delineated for sensitive and assessment sites. Sensitive and assessment sites residing in units retaining more than 40% canopy closure would receive a 100’ buffer, while sites within units retaining less than 40% canopy closure would receive a 200’ buffer.

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Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Affected	Given these protection measures, the proposed action would not trend these species toward federal listing and should assure persistence. Sites within units slated for fuels treatments would be protected, but since the overstory is not typically affected by prescribed burning activity, and fire is a naturally-occurring disturbance, buffer sizes would be less. Buffers would vary from 5 to 30 feet in diameter depending on 1) the prescribed fuels treatment, 2) the time of year treatment would occur, and 3) whether or not that species has demonstrated a tolerance to fire-related disturbance. For instance, if a species such as *Camassia howellii*, which has consistently demonstrated a favorable response to introduced fire, is within a prescribed burn unit and the burn is scheduled for late fall or very early spring (when the plant is dormant), that population would not receive a buffer. Given these protection measures, proposed prescribed burning activity would not trend these species toward federal listing and should assure persistence. **Bureau Special Status Fungi – NOT AFFECTED** The Planning Area was not surveyed for fungi, as pre-disturbance surveys for Special Status fungi are not practical, nor required per BLM – Information Bulletin No. OR 2004-121, which states "If project surveys for a species were not practical under the Survey and Manage standards and guidelines (most Category B and D species), or a species' status is undetermined (Category E and F species), then surveys would not be practical or expected to occur under the Special Status/Sensitive Species policies either (USDA FS and USDI BLM, 2004, p.3)." Current special status fungi were formerly in the aforementioned S&M categories which did not consider surveys practical, and are therefore exempt from survey requirements. With the recent re-instatement of Survey and Manage Protocols, these species were placed back into their respective S&M categories (9 species in B, 1 species in F) – none of which require surveys under S&M protocol. District wide, the Medford BLM has ten Bureau Sensitive (BSO) fungi species; six are suspected to occur here, while the remaining four have been documented. Of the four documented species, only one, *Phaeocollybia olivacea*, has been found in the Glendale Resource Area, approximately 1.75 air miles away from the Planning Area. Although this site and the Planning Area reside within the same HUC 5 Middle Cow Watershed, the microhabitat of the fungi site differs from the microhabitat of the closest Westside units.

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Special Status Species (not including T/E): Plant Species/Habitat (continued)	Not Affected	The west-facing riparian-influenced habitat surrounding the fungi site differs from the north-northeast-facing habitat of the closest Westside units, and, although this site was found by a highly qualified and respected botanist, the specimen was never officially verified by the regional mycologist. Based on the outcome of utilizing the 'Likelihood of Occurrence Key' provided from the BLM Oregon State Office, there is a "low likelihood of occurrence and low risk to species viability or trend toward listing," for sensitive fungi species potentially located in the Planning Area. While it is possible that this project is occurring within potential habitat for some species, there is very little information available describing the *exact* habitat requirements or population biology of these species (USDA,USDI 2004 (2004 Final SEIS vol.1) p. 148). Based on the above information, the likelihood of a Bureau Sensitive fungi species in this Planning Area is very low; the likelihood of a sensitive fungi occurring within a single unit(s) encompassed in the Planning Area is even lower. The likelihood of contributing toward the need to list is not probable.
Soil (productivity, erodibility, mass wasting, etc.)	Affected	Tractor, cable, and helicopter yarding corridors, road building (and decommissioning after use), proposed as part of this action would result in soil disturbance that would reduce localized areas of soil productivity, and/or increase erosion. This project would have a low risk of increasing the probability of a small, isolated mass movement. Compaction would not exceed 12% within any one unit or on a project level, keeping impacts from compaction within those levels assessed under the RMP. The decommissioning of existing and new roads would improve productivity in the long term. As would density management treatments and fuels reduction. The treatment fuels units and activity fuels, via underburning, hand-piling, and lop and scatter, could displace a small amount of soil, but should not be enough to reduce productivity, or cause soil to move offsite or into streams. Fuels treatments would be restricted to prescribed burning periods when fuel moisture is high and temperatures are less severe, it would not be expected that fuel treatments would result in any significant reductions in available nutrients, and thus would not result in any loss of soil productivity. *See section 3.4.1 Soils for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment..*

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Visual Resources	Not Affected	The Planning area is located within VRM (Visual Resource Management) Class I-IV category lands. These VRM categories allow for varying amounts of modifications to the existing character of the landscape. Additionally, manage rural interface lands using visual resource management Class III standards unless otherwise classified as Class I or II (RMP, p. 88). The Proposed Action is consistent with these visual resource management objectives as stated in the Medford District Resource Management Plan (page 70), and mitigated through the application of Project Design Features addressed within this document. Visual Contrast Rating sheets have been created and are located within the Westside analysis file.
Water Resources (not including water quality)	Affected	The proposed action is not anticipated to have a measurable effect on watershed hydrology, or beneficial uses associated with the quantity or timing of water at the HUC 6 level within this Planning Area. Designated beneficial uses in this Planning Area include private water supplies, irrigation, industrial water supplies, livestock watering, anadromous fish passage, rearing, and spawning, resident fish and aquatic life, wildlife and hunting, boating, fishing, and water contact recreation, and hydropower. Beneficial uses that could experience localized affects as a result of this action are anadromous fish rearing and spawning, and resident fish and aquatic life. With the exception of Wood Creek, there are no fish species that inhabit these tributary streams where localized impacts from the amount of TSZ open area may be seen. This project proposes to increase TSZ open space under alternative 2, which would likely lead to localized increases in peak flows. This is likely to cause channel instability and an increase in the amount of sediment within these headwater streams. Within this watershed the combined effect resulting from these impacts to several smaller headwater streams could potentially have a negative effect on headwater aquatics, such as macroinvertebrates in tributary streams and a localized reduction in the quality of fish habitat within Wood Creek. This is discussed in depth within Sections 3.4.1, 3.4.2, and 3.4.3 Soil, Water, and Fisheries. Increased water yields and potential reduction in low summer flows with the re-growth of hardwood species is also likely. Impacts to beneficial uses would be partially mitigated by placing a minimum of one tree length riparian buffers along all streams and springs adjacent to RH and OR units (where CT, GS, and fuels units occur these buffers would vary based on site specific criteria in order to allow riparian restoration treatments to occur). These buffers would protect most ecological and biological functions along streams and springs, as required under the ACS objectives in the NFP and the Medford RMP. In addition, Harr (1976) found that patch cutting within a watershed, combined with riparian buffers of 50-100 feet can reduce increases in water yield. Localized increases and decreases in water volumes, in small, isolated springs within units, could occur as stocking levels change during the first decade. See Section 3.4.2 for a discussion of the affected environment and environmental effects of the alternatives related to this element of the environment.

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Late-Successional Forest	Proposed action is in compliance with the 15% Standard and Guideline	Federal ownership of late-successional forest is approximately 49% (22,000 acres of 45,000 acres) of federal land within the Middle Cow Creek watershed (WA, p. 36). The Northwest Forest Plan standards and guidelines state that at least 15% of fifth field watersheds should be managed to retain late-successional patches (ROD, C-44). Approximately 1,515 acres of late successional forest would be harvested (3%). As such, the proposed action is in compliance with the 15% Standard and Guideline. The WA (p. 36) states that "[t}here are currently 13,248 acres of late-successional habitat within established reserves, representing 29 percent of the federal forest lands… This indicates that even if all the GFMA lands were logged, there would still be more than the required 15 percent of the federal forest lands in the watershed in a late-successional habitat condition." While the Watershed Analysis uses the term "late-successional habitat," the correct term is "late-successional forest" which is defined as a forest seral stage that includes mature and old growth age classes.
Migratory Birds Species of Concern (U.S. Fish and Wildlife Service 2002)	Not Affected, at a state or regional scale*	Both the U.S.D.I. Fish and Wildlife Service (2002) and Partners in Flight (Altman 1999) consider the state and regional approach a key to the conservation of migratory songbirds. In 1999, strategies for the conservation of the olive-sided flycatcher and the rufous hummingbird and other species were proposed in the form of a regional conservation plan for coniferous forests in Oregon and Washington. This strategy, which "represents the collective efforts of multiple agencies and organizations within …Partners in Flight," recognized the Northwest Forest Plan as an effort in the same type of conservation planning process, which approaches management at a regional level. The proposed actions are consistent with the Northwest Forest Plan, which is also designed to provide for the conservation of other forest-related species in the range of the Northern Spotted Owl, such as these songbirds. Within the Northwest Forest Plan (24,455,300 federal acres), reserved/ withdrawn lands total approximately 78% of the federal land base (USDA/USDI 1994, p. 2-62:65). Not all of the reserves are in or will obtain late-successional forest conditions, but the majority is expected to contribute as suitable habitat towards migratory birds utilizing late successional habitat. In addition, Matrix lands (3,975,300 acres) representing about 16% of the federal land base, contain selected portions of the land managed to retain 15-30% in late-successional forest, which provides additional suitable habitat. See Migratory Bird Specialist Report in Appendix 10.

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary teams predicted environmental impact per element if Alternatives 2 or 3 described in Chapter 2 of the Environmental Assessment were implemented.		
Other Elements of the Environment	**Status 1/ Not Present 2/ Not Affected 3/ Affected**	**Interdisciplinary Team Remarks 1/ If not affected, why? 2/ If affected, develop cause/effect statement, unit of measure, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Special Status Species (not including T/E): Wildlife Species/Habitat	Not Affected: Goshawk, Pond Turtle, Not Present (All other species): Pacific Pallid Bat Not Affected: Great Gray Owl; Oregon shoulderband Not Affected: Tailed Frog, Foothill Yellow-Legged Frog	Not Affected: Bureau Sensitive: Goshawk –There are no known sites within the Planning Area. Goshawk has been observed near Azalea and is likely to occur within the 5th field watershed. Removal of 1515 acres of late successional habitat, and thinning of 1567 acres of late successional habitat on matrix land would reduce habitat suitable for nesting. There is sufficient mix of seral stages including large trees in the Planning Area, including late successional reserve, and deferred or withdrawn habitat within Matrix to provide nesting, fledging, and foraging habitat. Viability rating would remain high and unchanged. (USDA/USDI 1994a 3&4 p179). Bureau Sensitive: Pond turtles occur in Galesville Reservoir, Cow Creek, and major tributaries. No treatments are proposed in this habitat. The Aquatic Conservation Strategy, Riparian Reserves, and LSR guidelines are expected to provide and maintain adequate habitat in the Planning Area and 5th field watershed. Bureau Assessment: fringed myotis bat and Pacific pallid bat – There is one known site of the fringed myotis, and no known sites of the Pacific pallid bat in the Planning Area. The fringed myotis ranges in western North America from British Columbia to Mexico. The Aquatic Conservation Strategy, Riparian Reserves, and late successional reserve management guidelines are expected to meet these species habitat needs in the Upper Cow Creek 5th field watershed. Some suitable snags may be removed due to safety concerns, in the removal of 1,515 acres of late-successional habitat, and thinning of 1,567 acres of late-successional habitat. No caves/ rock structures with crevices supporting roosting or hiburnacula would be disturbed. The viability level would be maintained as the NFP with Standards and Guidelines would provide 80% or greater likelihood of sufficient distribution of habitat (1994a p.3&4-187). Not Affected: Great gray owls have not been observed in the Planning Area, and proposed treatments would not occur within 200 meters of natural openings. Oregon shoulderband snail – occurs in the Planning Area, typical exposed bedrock/ deep talus, or mixed oak/conifer grassland habitat would not be removed or suitability degraded. Bureau Assessment: Tailed frogs most frequently occur in headwaters of fast-flowing streams. No treatments are proposed in this habitat. The foothill yellow legged frog occurs in Galesville Reservoir, small ponds adjacent to the reservoir, and Cow Creek. The proposed project is not expected to affect this species since all ponds, resevoirs, and major creeks would receive a no treatment buffer of two site-potential trees or 300ft slope distance, whichever is greatest. Riparian reserve management and Aquatic Conservation Strategy would maintain habitat conditions.

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary teams predicted environmental impact per element if Alternatives 2 or 3 described in Chapter 2 of the Environmental Assessment were implemented.		
Other Elements of the Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Special Status Species (not including T/E): Wildlife Species/Habitat - Continued	Not Present	Northern red-legged, American peregrine falcon, black-backed woodpecker, flammulated owl, Lewis' woodpecker, three-toed woodpecker, white-headed woodpecker, Siskiyou short-horned grasshopper, Townsend's big-eared bat, Chase sideband (snail), Siskiyou Hesperian, traveling sideband (snail), and white-tailed kite.
	Not Affected: red tree vole	Bureau Tracking – The red tree vole is likely to be present within project units and the action could potentially remove some habitat trees. However, this species was removed from the Survey and Manage list through the 2003 Survey and Manage Annual Species Review (signed December 19, 2003), because the species was found to be more abundant and widely distributed throughout its range. Potential effects to the red tree vole through project activities are not expected to affect species persistence. As a Bureau Tracking species, surveys, protecting known sites, or other management or mitigation (IM OR-2003-054) are not required. Since the red tree vole constitutes such a small component of spotted owl diet in the Klamath Mountains (0.9 percent of prey biomass) and because the timber sale removes such a small component (0.54 percent) of primary red tree vole habitat, the effect of the timber sale on spotted owl prey base in the watershed would be inconsequential.
	Not Affected: Del Norte salamander, pygmy nuthatch, California wolverine, Canada lynx, pine marten	Del Norte salamanders are associated with older, closed-canopy forests with rocky substrates dominated by cobble-sized pieces of rock (Welsh and Lind 1995). Since there is very little talus in the planning area, and no treatments are planned in this habitat, it is expected that this project would have no effect on Del Norte Salamanders. Pygmy nuthatches typically use tall pines. No pygmy nuthatches have been documented on the Glendale Resource Area (GLRA). Snag retention guidelines for matrix management (USDA/USDI NFP, p. C-41) are expected to meet the needs of this species where it occurs. Wolverines are not present in the GLRA. No surveys are planned in the GLRA because the area is not considered to provide habitat. Medford BLM was excluded from the known range due to the absence of lynx habitat characteristics (involving elevation and snow depth) and lack of historic sightings. Although lynx have been taken in Oregon, "available evidence suggests that the lynx Pine marten have been documented in the western sector of the GLRA in high-elevation conifer forest. They are thought to be present in the forested habitats across the lands administered by the GLRA. Martins inhabit forested habitats at any elevation and would use openings in forests if there are downed logs to provide cover (Csuti, et al. 1997). They are a forest species capable of tolerating a variety of habitat types if food and cover are adequate. They prefer mature forests that contain large quantities of standing and downed snags and other coarse downed woody material, often near streams. They often use down logs for hunting and nesting. Martins are not found in dry woodlands. They feed on small mammals, birds, fruits, and insects.

Table 2. Other Elements of the Environment. This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary teams predicted environmental impact per element if Alternatives 2 or 3 described in Chapter 2 of the Environmental Assessment were implemented.		
Other Elements of the Environment	**Status** **1/ Not Present** **2/ Not Affected** **3/ Affected**	**Interdisciplinary Team Remarks** **1/ If not affected, why?** **2/ If affected, develop cause/effect statement, unit of measure, and if applicable, design features not already identified in Appendix D of the RMP to reduce or avoid environmental harm**
Port-Orford-cedar	Not Present	

Table 3. Aquatic Conservation Strategy Summary. This table lists the four components of the Aquatic Conservation Strategy (RMP pp. 5-7) and the interdisciplinary teams predicted environmental impact per component if the alternatives described in Chapter 2 of the Environmental Assessment were implemented.		
Components	**Consistency With ACS**	**Remarks /References**
Riparian Reserves	Consistent	Habitat would be improved through treatments designed to reduce the occurrence of tightly spaced, even aged stands, and promote the creation of late successional characteristics and future large woody debris. Current shade cover would be retained on streams. See riparian reserve PDFs for further discussion on this topic.
Key Watershed	Consistent	The proposed action is not located within a Tier 1 Key watershed.
Watershed Analysis	Consistent	*Middle Cow Creek Watershed Analysis*, October, 1999. *Grave Creek Watershed Analysis*, August, 1999.
Watershed Restoration	Consistent	Control oand prevention of road related run-off and sediment production: The action alternatives entail road maintenance and net road mileage reduction within the watershed that in the long-term will reduce road related run-off and sediment production. Restoration of the condition of riparian vegetation: Riparian Reserves will be thinned to promote the creation of late-successional characteristics on an accelerated timeframe.

APPENDIX 3
PUBLIC COMMENT TO WESTSIDE LANDSCAPE PLANNING PROJECT SCOPING REPORT AND BLM RESPONSE

Public scoping included mailing invitations to approximately 1,281 residents of the towns of Glendale and Azalea to attend a public scoping meeting. The public meeting was provided on April 28, 2005 at the Azalea Grange Hall. General descriptions of proposed forest management activities were presented along with their map locations. About 30 local residents attended. A subsequent scoping report was mailed to those attending the meeting along with the standard mailing list of individuals and organizations expressing interest in Glendale Resource Area projects requesting public comment from June 7, 2005 to July 7, 2005. The BLM received 32 public responses from either letters or emails. Comments were considered in the development of the Proposed Action.

Joseph Vaile for Klamath Siskiyou Wildlands Center, Cascadia Wildlands Project, Oregon Natural Resources Council, Umpqua Watersheds Inc., Siskiyou Project

comment a: Nowhere does the Northwest Forest Plan mandate the logging of old-growth forest. The real controversial aspect of this project is the old-growth logging.

<u>BLM Response</u>: The concerns of whether to harvest old-growth trees, whether to allow commercial timber harvest of these lands, or whether to use timber harvest in general, to achieve landscape management objectives was already decided upon. The Medford District BLM has already completed an Environmental Impact Statement for the Resource Management Plan, known as the 1995 Medford District Resource Management Plan/Environmental Impact Statement (RMP-EIS). The RMP is itself an implementation of the Northwest Forest Plan (NFP) which was also prepared by federal agencies, including the BLM. These EISs, and the corresponding RODs, specifically contemplated the ecological significance of the areas in which commercial and non-commercial timber harvest activities would be planned. The Westside Project EA conforms to the analysis of these impacts already contained in these programmatic EISs.

Comment b: The Glendale RA should refrain from logging mature and old-growth forest and thin plantations instead.

<u>BLM Response</u>: An alternative to thin only was considered and eliminated from further study and the reasons are provided in Appendix 1 of the EA, Alternative Development Summary. The purpose and need of the EA clearly addresses the issue by stating that "[f]or sustained yield the Medford ROD/RMP assumed an average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP, p. 9). However, the actual amount offered for sale on the Medford District from 1995 to 2004 fell far below this amount, as it was less than 500 acres of regeneration harvest and overstory

removal per year. The RMP identified regeneration and overstory removal as the primary method of harvest on northern general forest management areas (NGFMA) lands (RMP, p 187). Commercial thinning is not a sustainable method of harvest but produces timber and is appropriate where stands are overstocked and to assure high levels of volume productivity.

The need for harvest treatments in the Westside Planning Area is to meet the NGFMA direction in the Medford RMP/ROD of providing a sustainable supply of timber that would trend toward a forest composed of stands containing a variety of structures, ages, sizes, and canopy configurations generally through the even-aged management silvicultural system (RMP, p. 187). Where appropriate the modified regeneration silvicultural treatments would occur at a minimum 100 years of age (ROD/RMP, p. 74).

The Middle Cow Creek Watershed Analysis (WA, p. 35) estimated that 58% of NGFMA lands within this area are mature and older stands. Approximately 39% of the older stands are over 200 years of age. Individual stands currently have an all aged structure developed as a result of past disturbances such as natural fire or partial cut harvesting. The desired landscape on NGFMA lands within the Westside Planning Area is a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66)."

comment c: The information and recommendations in the Middle Cow Creek WA must serve as the basis for developing proposals in the Westside EA.

<u>BLM Response</u>: As stated on page 10 of the EA "The *Middle Cow Creek Watershed Analysis* is incorporated by reference. Watershed analysis is an analytical process and not a decision-making process as provided in the Record of Decision for the Northwest Forest Plan (p. B-20)." The Middle Cow Watershed Analysis was considered in the Westside Project analysis. The Purpose and Need section cites the WA that "[t]he Middle Cow Creek Watershed Analysis (WA, p. 35) estimated that 58% of northern GFMA lands within this area are mature and older stands. Approximately 39% of the older stands are over 200 years of age. Individual stands currently have an all aged structure developed as a result of past disturbances such as natural fire or partial cut harvesting. The desired landscape on NGFMA lands within the Westside Planning Area is a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66)."

comment d: WA states that "A higher level of connectivity should be maintained along the north and south ridges to promote east-west movement of species" (WA, p.69)

<u>BLM Response</u>: An alternative was considered considering connectivity along the north and south ridges. The alternative was considered but eliminated from detailed study. That analysis was provided under Appendix 1 of the Westside EA.

comment e: WA also states "regeneration harvest within the GFMA connectivity bands on the north and south ridges should be avoided in the next decade or two to allow more contiguous forest stands to develop" (WA, p. 67).

<u>BLM Response</u>: See response to comment "b" and "d."

comment f: "An aggressive effort should be made to reduce open road density…"(WA, p.67)

<u>BLM Response</u>: An alternative to reduce open road densities was considered but eliminated from further study. That analysis was provided under Appendix 1 of the Westside EA.

comment g: The current pace of timber sale planning could result in 1,200-1,400 acres of regeneration logging on Matrix lands in Middle Cow Creek watershed, which is "considerably greater than the projected 920 acres of decadal regeneration harvest" in the RMP.

<u>BLM Response</u>: The Medford RMP does not separate this overall figure into individual watersheds. Your comment regarding decadal harvest is not found in the RMP but in the Middle Cow Creek Watershed Analysis (WA), which states that "Assuming a 100 year rotation age …an evenly distributed timber harvest on BLM lands in the watershed would result in approximately 920 acres of regeneration harvest per decade." The WA clarifies this statement in the next sentence by saying "This is a greatly simplified analysis, since productivity varies greatly between locations, but is a useful aid in assessing relative timber availability and future projections of impacts" (WA, p. 50). Under the principles of sustained yield, the determination of the annual productive capacity is based upon the calculation of the Allowable Sale Quantity. In this calculation the current forest inventory is used to project over many hundreds of years the management practices outlined in the plan to demonstrate the harvest levels are sustainable, not during a 10 year period.

The Need statement in the EA states that "For sustained yield the Medford ROD/RMP assumed an average annual harvest of 1,140 acres of regeneration harvest and overstory removal the first decade (ROD/RMP, p. 9). However, the actual amount offered for sale on the Medford District from 1995 to 2004 fell far below this amount, as it was less than 500 acres of regeneration harvest and overstory removal per year. While Westside proposes more than 920 acres of regeneration harvest, the decadal amount would vary during the 100 year rotation period. The WA mentions that the desired landscape on NGFMA lands within the Westside Planning Area is a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66).

comment h: Logging and roading activities will contribute to the spread of these, and other noxious weeds.

<u>BLM Response:</u> As stated in Appendix 2 of the EA, there are three main reasons why

potential weed establishment is not expected to result in a detectable effect to overall ecosystem health. First, surveys indicate that a very small percentage - less than 1% of acreage within the Planning Area units - are affected by noxious weeds. Second, these sites located in units proposed for treatment have been reported during predisturbance surveys, and are proposed for weed treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14*. Third, Project Design Features (PDFs) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources.

Comment i: The BLM should continue to survey for and manage populations of rare LSOG dependant species such as the Red Tree Vole, Del Norte Salamander, Great Gray Owl and other at-risk species.

<u>BLM Response:</u> The Westside EA is compliant with the 2001 Survey and Manage EIS and subsequent Annual Species Reviews. Appendix 2 of the EA considered how those species yor identify are being managed and what surveys would or would not occur.

comment j: The WA indicates that the Middle Fork Cow Creek may be particularly important habitat for the Del Norte salamander (WA, p.45).

<u>BLM Response</u>: The Middle Cow Watershed Analysis was written prior to the removal of the Del Norte salamander from the list of Survey and Manage species. The removal was done through the Annual Species Review as allowed under the Survey and Manage ROD, 2001 (p. 8). See response to "i" above.

comment k: New construction and lack of maintenance on private land point to a decline in stability and an overall increase in sediment production (WA).

<u>BLM Response</u>: The cumulative effects analysis to soils, water resources and fisheries in Chapter 3 of the EA addresses erosion and sedimentation on private and federal lands within the Planning Area.

comment l: Hydrologic cumulative effects resulting from private logging, checkerboard ownership and recent BLM actions may defer timbered stands a period of time to allow the watershed to recover (WA, p. 61)

<u>BLM Response</u>: The cumulative effects analysis to soils, water resources and fisheries addresses hydrologic effects on erosion and sedimentation on private and federal lands within the Planning Area.

comment m: Page 57 of the WA identifies 'Pre-commercial thinning and brushing units since 1993' and 'timber harvest units since 1993" as the first two categories of 'highest priority for fuels management.' Have these activities been prioritized?

<u>BLM Response</u>: These activities are being prioritized as money is made available. Currently, the BLM has an ongoing fuels management program that prioritizes pre-

commercial thinning and brushing work within the Wildland Urban interface. Also there are ongoing silvicultural treatments that include pre-commercial thinning within previously harvested stands to reduce stocking with the added effect of reducing fuel hazards. The Westside EA analyzed 988 hazardous fuel reduction acres. In June 2005, five thousand acres of pre-commercial thinning (PCT) began in the Glendale Resource Area to be implemented over a five year period (fiscal year 2005-2009). Portions of this pre-commercial thinning overlaps the Westside Project Planning Area. Proposed treatments include early stand thinning, vegetation competition release, pruning, and piling and burning of created slash.

comment n: Fire hazard is believed to be on an upward trend due to fire suppression allowing for more build up of fuels. Recent clearcutting has resulted in young even-aged stands, making stands more vulnerable to stand replacement fire (WA).
The BLM's late-successional logging proposal fails to address both public comments regarding consistency with the WA and findings of the WA itself.

BLM Response: Clearcutting removes all trees on a given area and was noted in the WA for effects on private lands. For BLM lands regeneration harvesting would retain structural components of at least 6-8 large trees per acre. The Westside EA analyzes the effects of the alternatives to stand replacement fires in the Fire Risk and Fire Hazard section of Chapter 3.

Comment o: We ask the Glendale Resource Area to consider an alternative that best meets the recommendations to make "an aggressive effort" to reduce road densities in the watershed. Please provide substantive analysis and disclosure of the cumulative hydrological impacts of the private and federal logging and roading programs in the planning areas.

BLM Response: An alternative to thin only was considered but eliminated from further study. The reasons are discussed in Appendix 1 of the EA, Alternative Development Summary. See responses to comments "k" and "l" above. Most of the roads within the Westside Planning Area are not public roads and are under reciprocal right-of-way agreements with private landowners because of the checkerboard ownership pattern. The BLM does not have the option to close these roads.

Comment p: KS Wild proposes an Alternative that would thin plantations instead of RH, OR or GS prescriptions and leave 60% canopy. This would provide wood products while protecting the most important forest structures for habitat connectivity in the Cow Creek. No new roads, including temporary. Only allow high lead cable. Meet USFWS minimum requirements for NSO by leaving 60% canopy. Treat 2,500 acres for fire hazard. Late successional blocks should be retained. We request that the BLM at least consider this alternative that does not decrease late-successional cover, build new logging roads.

BLM Response: An alternative to thin only was considered but eliminated from further study. The reasons are discussed in Appendix 1 of the EA, Alternative Development Summary. See response to 'b."

Your proposal would limit treatments to the youngest stands and would not treat older stands or treat stands on sites that historically maintain less than 60% canopy. In the Morongo Band of Mission Indians v. Federal Aviation Admin., parties claiming a NEPA violation involving failure to consider a reasonable alternative must offer a specific, detailed counterproposal that has a chance of success. Also in other cases it was determined that an agency does not have to consider alternatives that are not feasible, Headwaters, Inc., 914 F.2d at 1180-1181 and an agency does not have to consider alternatives that would not accomplish the purpose of the proposed project, City of Angoon v. Hodel 803 F.2d 1016, 1021 (9th Cir 1986).

Temporary and permanent road construction is proposed to access treatment units where no roads exist or road conditions are overgrown and inaccessible. Units without current accessibility considered helicopter logging. Approximately 1,033 acres are proposed for helicopter logging in Alternative 2 and 911 acres are proposed under Alternative 3.

Helicopter yarding is used instead of tractor or cable yarding methods for such reasons as limited access due the high cost of building roads or risk sedimentation from mid-slope road building. The Purpose and Need of the project states that “Applying modified regeneration silvicultural treatments at a minimum of 100 years of age (RMP, p. 74). This age level is sustainable and would meet economic and logging-practicality requirements.” The costs for helicopter logging are much higher than conventional harvesting systems. The appraisal costs for helicopter yarding with the Boeing BV-234 is $5,400 an hour with a consumption of 405 gallons of jet fuel an hour. A heavy helicopter such as a Boeing BV-234 can lift up to 10,000 pounds and would be needed for trees with over 1,000 pounds (greater than 24 inches DBH). A small heavy helicopter such as a K-Max can lift up to 5,000 pounds and can be used for logs less than 1,000 pound (less than 24 inches DBH). Move in costs would be approximately $10,000 per ship.

As an example the appraisal cost of helicopter yarding came out to $302/mbf, the cost for cable yarding system came out to $139/mbf on the Willy Slide Timber Sale

Temporary roads do not contribute to the overall road density since they are decommissioned after use (ripped with a winged subsoiler, waterbarred, mulched and seeded).

Chandra Legue for Oregon Natural Resources Council

comment q: Dense young plantations are more susceptible to severe fire effects than unmanaged older stands (DellaSalla et al. 1995, Weatherspoon & Skinner).

BLM Response Scientific evidence exists supporting the notion that plantations are vulnerable to fire and may exacerbate fire behavior, particularly during times of dry conditions and in stands that have received slash-producing maintenance treatments (such as pre-commercial thinning) where the slash remains on site and is not mitigated (Martin, 2006). However, in most instances monitored in older stands in the local area reveal that the number of small trees (0-8 inches dbh) with varying heights are at such levels of abundance that these stands are also vulnerable to fire and have the potential to produce catastrophic fire behavior during dry conditions (Martin, 2006). The short term effect of regeneration harvest activities may be a potential increase in fire hazard due to the presence of slash on site. This increase is considered short term until the slash is mitigated by fuels treatments, which generally occurs within six months to two years after the harvest activity takes place. In the long term (0 to 10 years), fire hazard may be potentially decreased.

comment r: The number and distribution of plantations resulting from industrial timber management likely has altered fire behavior and effects at both stand and landscape scales (Hann et al. 1997, Huff et al. 1995). Perry (1995) suggests that the existence of a threshold proportion of highly combustible even-aged tree patches on a forest landscape creates the potential for a "self –reinforcing cycle of catastrophic fires." In addition, most plantations occur next to roads that spread invasive and exotic plants (DellaSalla and Frost 2001) and increase the risk of human caused ignitions during hot, dry conditions (USDA 2000).

BLM Response: The Westside EA analyzed the potential effects of fire risk and fire hazard and the threshold of concern in section 3.2. Private timber lands were also considered under cumulative effects in the same section. Plantations, although they may present an area with increased fire rates of spread due to the presence of flashier fuels, may also provide areas in which effective and efficient fire suppression operations can occur (Martin, 2006). For example, air attack operations with air tankers and helicopters are generally less effective in stands with larger trees and closed canopies. Also, access through managed areas is already in existence, meaning mechanical equipment such as dozers can be used in a much more efficient manner. Existing fire barriers, such as roads and firelines, may also already exist in managed areas, meaning fire control lines take less time to construct than in older stands, in most instances (Martin, 2006).

See analysis of noxious weeds in Appendix 2 and specialist report on noxious weeds in Appendix 8. See response to "h"

comment s: "You should develop an alternative that does not log in mature and old-growth forests, and one that uses less aggressive thinning prescriptions."

BLM Response: See responses to "a" and above "p" above.

comment t: The proposed action does not disclose the ages of the stands slated for commercial thinning.

BLM Response: As mentioned in the Purpose and Need section of the EA, stands in southern Oregon have developed all aged structures. Commercial thinning produces timber and is appropriate where stands are overstocked and to assure high levels of volume productivity. Applying commercial thinnings would be designed to assure high levels of volume productivity in stands less than 120 years of age (RMP, p. 189). While the exact ages of the stands vary, the Westside Silviculture Prescriptions analyze each harvest unit under the stated objectives for commercial thinnings "to reduce stand densities so that competition is reduced on the retained trees for light, water, nutrients and growing space."

<u>comment u</u> In young stands in Riparian Reserves, we support thinning activities that enhance the development of trees to shade streams and become sources of coarse woody debris and do not impact aquatic habitat.

<u>BLM Response</u>: We agree with your comment. As stated in the EA "The objective of riparian thinning treatments is to create a stand that is on a trajectory to reach a late-successional condition. Many of these units are dominated by smaller diameter stands of Douglas fir and some hardwoods. Most stands are lacking large wood debris, downed logs, and large tree structure. The treatment would reduce competition on the retained trees for light, nutrients, water and growing space. These trees would develop larger canopies, display better vigor and put on diameter growth faster then if left untreated. Canopy gaps would also be created in these zones to promote multiple-layered stands and promote species diversity that is a key element in late-successional habitat. Production of wood volume is a bi-product of this treatment, but is not a primary objective"

<u>comment v:</u> The Westside proposal calls for 10 new miles of temporary and permanent road construction. The road density in the project area is already very high. More roads only contribute more to the negative environmental impacts of roads already seen throughout the Roseburg BLM lands.

<u>BLM Response</u>: See response to "f," "k" above regarding road density. The Westside Planning Area is not within the Roseburg District of the BLM but is within the Medford District of the BLM.

<u>comment w:</u> Since the Northwest Forest Plan and the Medford BLM RMP were originally approved, significant new information has come to light regarding the increasingly uncertain fate of the Northern spotted owl with the implication that all remaining suitable habitat is more valuable than considered in any previous NEPA document. New information about the threatened Northern spotted owl indicates that there are significant new uncertainties for the owl that have not been fully considered in any NEPA document at the regional or local scale. As recognized by FWS' recent spotted owl status review, all existing suitable habitat may be critical to the survival of the spotted owl.

Significant new information includes:

*<u>Competition and displacement from the barred owl</u> which is dramatically increasing in numbers within the range of the spotted owl; **Implications**: More suitable habitat may need to be protected to ensure that these two owl species can co-exist.*

*<u>The effects of West Nile Virus which is fatal to the owl</u>; **Implications:** A larger population may be better able to survive the stochastic pressures of this disease. It may be important to avoid any further "take" of birds or habitat at least until the disease has run its course. Isolated stands of old-growth may also be important because they may be dryer and have*

fewer mosquito vectors. Geographic isolation might also help protect them from the contagious spread of the disease.

*The potential loss of habitat from Sudden Oak Death syndrome; **Implications:** Loss of habitat to SOD, makes remaining habitat more valuable than previously considered in any programmatic NEPA document.*

*Greater than expected loss of habitat to wildfire over the several years; **Implications:** Loss of habitat to fire and the risk of more such losses, makes all remaining habitat more valuable than previously considered in any programmatic NEPA document.*

*The potential effect of climate change on regional vegetation patterns; **Implications:** Under a new climate regime, we may not be able to regrow new owl habitat in the reserves as assumed in the NW Forest Plan. Existing old forests are relatively resilient to climate change. It is risky to be conducting regen harvest and expected to be able grow new owl habitat in the reserves under an uncertain climate regime;*

*Misapplication of the Healthy Forests Initiative. **Implications:** While it is true that some treatments if carefully done could help reduce the risk of fire while also retaining some owl habitat values, many such fuel reduction treatments in eastside owl habitat will degrade some existing owl habitat, so the remaining owl habitat throughout the owls range becomes more important than previously considered in any programmatic NEPA document.*

*The 9th Circuit's ruling in Gifford Pinchot Task Force v. USFWS that avoiding jeopardy is not enough, that critical habitat is intended for recovery. **Implications:** The decision to approve the Trapper timber sale was based on an erroneous legal standard for management of critical habitat. It is likely that retaining all suitable habitat will be necessary to preserve options for recovery. A change in information, requiring NEPA supplementation "need not be strictly environmental…; the test is whether the new information so alters the project's character that a new 'hard-look' at the environmental consequences is needed."…[I]nformation "that does not seriously change the environmental picture, but that nevertheless affects, or could affect, the decision making process, is subject to the procedural requirements of NEPA." Natural Resources Defense Council v. Lujan, 768 F. Supp. 870, 886-87 (D.D.C. 1991).*

The status review shows that habitat loss has been greatest in Oregon. Before "taking" any more spotted owls and before adversely modifying any more suitable habitat, the agencies must prepare a new EIS that considers all the new information and considers whether to increase protection for spotted owl strongholds in Oregon.

BLM Response: The *Evaluation of the Medford District Resource Management Plan Relative to Four Northern Spotted Owl Reports* (August 2005) accurately addressed significant new information on the NSO. Specifically considered were the following four reports:

- *Scientific Evaluation of the Status of the Northern Spotted Owl* (Sustainable Ecosystems Institute, Courtney et al. 2004);

- *Status and Trends in Demography of Northern Spotted Owls, 1985-2003* (Anthony et al. 2004);
- *Northern Spotted Owl Five Year Review: Summary and Evaluation* (USFWS, November 2004); and
- *Northwest Forest Plan – The First Ten Years (1994-2003): Status and trend of northern spotted owl populations and habitat, PNW Station Edit Draft* (Lint, Technical Coordinator, 2005).

In producing the evaluation, the BLM, Forest Service (FS), and US Fish and Wildlife Service (USFWS) conducted a coordinated review which summarized key findings of these four documents. These key finding were reviewed by report authors Dr. Steven P. Courtney and Dr. Robert G. Anthony to ensure that it accurately reflects their findings. In addition, agency representatives Terry Rabot and Joseph Lint reviewed the document to verify that the USFWS five-year review and the ten-year NSO status and trend report, respectively, were appropriately incorporated. *The Evaluation of the Medford Resource Management Plan Relative to Four Northern Spotted Owl Reports* contains the interagency review and summary of the findings from those reports.

The BLM planning regulations require that the District Manager monitor and evaluate the plan at "established intervals … and at other times as appropriate to determine whether there is sufficient cause to warrant amendment or revision of the plan" (see 43 CFR 1610.4-9). As a key element of the NFP monitoring strategy, completion of the NSO status and trend portion of *The First Ten Years* monitoring report, as well as the other timely studies pertinent to the NSO, is considered appropriate to warrant this focused evaluation. The monitoring report and this evaluation carry out the process of monitoring and adaptive management envisioned by the Northwest Forest Plan, as adopted and implemented through the Medford District RMP.

In summary, although the agencies anticipated a decline of NSO populations under land and resource management plans during the past decade, the reports identified greater than expected NSO population declines in Washington and northern portions of Oregon, and more stationary populations in southern Oregon and northern California. The reports did not find a direct correlation between habitat conditions and changes in NSO populations, and they were inconclusive as to the cause of the declines. Lag effects from prior harvest of suitable habitat, competition with barred owls, and habitat loss due to wildfire were identified as current threats; West Nile virus and Sudden Oak Death were identified as potential new threats. Complex interactions are likely among the various factors. The status of the NSO population, and increased risk to NSO populations due to uncertainties surrounding barred owls and other factors, were reported as not sufficient to reclassify the species to endangered at this time. The reports did not include recommendations regarding potential changes to the basic conservation strategy underlying the NFP, however they did identify opportunities for further study.

The Medford District Manager found the effects on NSO populations identified in the four reports are within those anticipated in the RMP EIS, and that the RMP goals and objectives are still achievable in light of the information from the reports. As such, the Medford

District Manager found that the latest information on the NSO does not warrant a change in RMP decisions pertinent to the NSO, and therefore does not warrant amendment or revision of the Medford RMP. The Medford District Manager also found that the underlying analysis in the Medford EIS remains adequate for purposes of tiering NEPA analyses of NSO effects from proposed actions implementing the RMP.

comment x*: Avoid commercial timber harvest, roads, and mining in late-seral forests.*

<u>BLM Response</u>*:* See response to 'a,' 'b' and 'f.'

comment y: Impacts on old-growth species should be discussed in detail in the EA/EIS. This should include a functionality analysis of dispersal for the northern spotted owl between LSRs, and analysis of effects on such species as the goshawk, bats, Canada Lynx, woodpeckers, Pine Marten, California Wolverine, Red Tree Vole, Great Gray Owl, Pygmy Nuthatch, Bald Eagle and other special status species listed in applicable management plans.

<u>BLM Response</u>: Appendix 2 of the Westside EA identified all survey and manage and special status species with known habitat in the area. Those species that have habitat within the Planning Area were identified as whether being Present, Affected or Not Affected. Those species that were identified as being affected were analyzed for effects in the EA. Del Norte salamanders are associated with older, closed-canopy forests with rocky substrates dominated by cobble-sized pieces of rock (Welsh and Lind 1995). Since there is very little talus in the planning area, and no treatments are planned in this habitat, it is expected that this project would have no effect on Del Norte Salamanders. Pygmy nuthatches typically use tall pines. No pygmy nuthatches have been documented on the Glendale Resource Area (GLRA). Snag retention guidelines for matrix management (USDA/USDI NFP, p. C-41) are expected to meet the needs of this species where it occurs. Wolverines are not present in the GLRA. No surveys are planned in the GLRA because the area is not considered to provide habitat. Medford BLM was excluded from the known range due to the absence of lynx habitat characteristics (involving elevation and snow depth) and lack of historic sightings. Although lynx have been taken in Oregon, "available evidence suggests that the lynx has never been a part of the resident fauna of Oregon" (Bull, et al. 2001). All species listed in your comment are found in Appendix 2.

comment z: Project analysis should separately discuss each of the Aquatic Conservation Strategy objectives. Any commercial harvest activities or road construction in key watersheds or municipal watersheds should be avoided in order to protect water quality.

The Westside Planning Area is not within a key watershed or municipal watershed.

Francis Eatherington for Umpqua Watersheds 5/23/05

comment aa: Eliminate all regeneration harvests. This area is a critical corridor for Northern Spotted Owls, connecting the Coast Range, Siskiyou Klamath Mountains, and the Cascade Mountain. Owls are declining throughout their range. One reason is the *invasion of Barred Owls. This information was not considered when developing the Northwest Forest Plan so you must fully consider it in the NEPA documents for any project that removes Spotted Owl habitat. Please include all information on Barred owl increases in this area. Spotted owls need all currently available habitat, now, more than ever, because of the Barred owl. Please consider an alternative that does not include regeneration harvest of mature or old-growth forests.*

BLM Response**:** See responses to "b," "d"and "w." The NFP considered the issue of connectivity and developed a system of reserves, connectivity blocks and 100 acre owl core areas. The Medford RMP EIS identified the concern for this east-west swath and stated in the analysis that "[h]abitat loss in these areas due to past logging could have already resulted in a significant loss of connectivity between physiographic provinces and consequent reproductive isolation."

The Westside Project interdisciplinary team determined that the northern ridge does not provide a continuous west to east band of federal land because of heavily harvested private lands to the west, intermingled land ownership and the I-5 corridor, which forms a barrier, and runs north to south at the eastern edge of the Planning Area. The southern ridge also has the same barriers to the west to east movement of species because of intermingled private land and the I-5 corridor.

The EA (see 3.3.3.1 identifies that "[t]hree known barred owl sites are located within the Planning Area near the Swamp Gas, Lawson Creek and Tunnel Ridge activity centers.

comment bb: Some LSRs in the project area likely are not providing spotted owl habitat. Please consider an alternative that restores LSRs to useable owl habitat before removing currently functioning habitat.

BLM Response: The Westside Planning Area is not within a Late-Successional Reserve.

comment cc: Please do no regeneration harvests in VRM class 2. Even if the clearcuts can not be seen from Interstate 5, it is dishonest to hide from the Public what you are really doing.

BLM Response: The BLM has not practiced clearcutting since the implementation of the Northwest Forest Plan. Clearcutting removes all trees on a given area. Regeneration harvests leave at least 6-8 large conifers per acre. These conifers would be composed of existing species and would be across the range of diameters. Additional trees would be left where coarse woody debris present on the site did not meet RMP standards. In addition, three-five large hardwood trees per acre would be retained (where available) as well as existing snags and down logs.

There are units proposed for overstory removal, shelterwood, or regeneration harvest in VRM II lands. These harvest treatments retain at least 6-8 trees per acre compared to a clearcut harvest that removes all trees. The photo below is taken of Unit #3 of the Lost

Fortune Timber Sale, in the foreground, that is within the Westside Planning Area. Approximately 10 large trees per acre were retained in this overstory removal.

The designation of VRM class II is not to mislead the public, it is to manage BLM lands where activities may be seen but should not attract the attention of the casual observer (RMP, p.70) traveling along I-5. As such, unit prescriptions were developed to minimize the visual contrast of these areas. See Visual Contrast Rating Worksheets in Appendix. VRM class II along I-5 only extends as far as the foreground or middleground (one mile or to the first ridge, whichever is closer). Outside of the VRM class II area, matrix lands are designated primarily for rotational timber production.

comment dd: 4. If this project involves commercial logging in Riparian Reserves, I assume it is only in managed plantations in the reserves. Please consider leaving the largest of the trees that need to be thinned as dead wood to help accelerate restoration. For instance, the largest of the trees that you feel need to be removed, please fell them into the streams instead, or leave them as snags for wildlife.

<u>BLM Response</u>: See response to “u” above. As stated in the EA: The objective of riparian thinning treatments is to create a stand that is on a trajectory to reach a late-successional condition. Many of these units are dominated by smaller diameter stands of Douglas fir and some hardwoods. Most stands are lacking large wood debris, downed logs, and large tree structure. The treatment would reduce competition on the retained trees for light, nutrients, water and growing space. These trees would develop larger canopies, display better vigor and put on diameter growth faster then if left untreated. Canopy gaps would also be created in these zones to promote multiple-layered stands and promote species

diversity that is a key element in late-successional habitat. Production of wood volume is a bi-product of this treatment, but is not a primary objective"

The treatments proposed follow the Ecological Protection Width Needs chart (ROD, B-15). This chart is based on slope and rock type, and takes into account protection of streams from "surface erosion of streamside slopes, fluvial erosion of the stream channel, soil productivity, habitat for riparian-dependent species, the ability of streams to transmit damage downstream, and the role of streams in the distribution of large wood to downstream fish bearing waters" (B-15, Standards and Guidelines). Within this buffer zone forest health thinning treatments such as thinning and fuels treatments would occur.

comment ee: If this project involves commercial logging in Late Successional Reserves, please leave the largest of trees that would be removed for thinning, as snags for wildlife instead. A native old-growth forest has a large component of snags. In late successional reserves, these snags are retained for wildlife and not removed for their (so-called) fire hazard.

The same considerations should be true for managed plantations being restored to accelerate old-growth characteristics. It should be allowed to have a natural amount of dead wood that would be available in the older forest you are trying to create. This can be attained by retaining, as snags, the largest of the trees you would otherwise sell.

<u>BLM Response</u>: The Westside Planning Area is not within a Late-Successional Reserve

comment ff: Include an alternative that uses helicopter.

<u>BLM Response</u>: Alternative 2 proposes approximately 1,033 acres for helicopter logging and Alternative 3 proposes approximately 911 acres. Helicopter yarding is used instead of tractor or cable yarding methods for such reasons as limited access due the high cost of building roads or risk of sedimentation from mid-slope road building. The Purpose and Need of the project states that "Applying modified regeneration silvicultural treatments at a minimum of 100 years of age (RMP, p. 74). This age level is sustainable and would meet economic and logging-practicality requirements." It is important to note the costs for helicopter logging are much higher than conventional harvesting systems. The appraisal costs for helicopter yarding with the Boeing BV-234 is $5,400 an hour with a consumption of 405 gallons of jet fuel an hour. A heavy helicopter such as a Boeing BV-234 can lift up to 10,000 pounds and would be needed for trees with over 1,000 pounds (greater than 24 inches DBH). A small heavy helicopter such as a K-Max can lift up to 5,000 pounds and can be used for logs less than 1,000 pound (less than 24 inches DBH). Move in costs would be approximately $10,000 per ship.

As an example the appraisal cost of helicopter yarding came out to $302/mbf, the cost for cable yarding system came out to $139/mbf on the Willy Slide Timber Sale.

Francis Eatherington for Umpqua Watersheds 7/06/05

comment gg: The June 22, 2005 scoping comments from Klamath-Siskiyou Wildlands Center urged you to consider alternatives that did not log old-growth. We would like to emphasize this and request that you ***consider alternatives that do not log mature and old-growth forests. Instead, consider thinning managed plantations****.*

BLM Response: See responses to “a,” “b,” and “p.”

comment hh: Several of the "overstory removal" stands have already had the old-growth component degraded. The remaining overstory trees should be retained and the understory commercially thinned. Other "regeneration harvest" units appeared to have more intact overstories. These units should be deferred from any harvest at all, at least until you have restored the old-growth habitat in the Late Successional Reserves.

BLM Response: The direction in the Medford RMP is to maintain at least 15% late successional forests within a watershed. As stated in the Purpose and Need section of the EA: “[t]he Middle Cow Creek Watershed Analysis (WA, p. 35) estimated that 58% of northern GFMA lands within this area are mature and older stands. Approximately 39% of the older stands are over 200 years of age. Individual stands currently have an all aged structure developed as a result of past disturbances such as natural fire or partial cut harvesting. The desired landscape on NGFMA lands within the Westside Planning Area is a mosaic of even-aged stands between 0 and 100 years old, distributed relatively evenly within the watershed, with each age class in approximately even proportions (WA, p. 66).

The WA (p. 36) states that “[t}here are currently 13,248 acres of late-successional habitat within established reserves, representing 29 percent of the federal forest lands… This indicates that even if all the GFMA lands were logged, there would still be more than the required 15 percent of the federal forest lands in the watershed in a late-successional habitat condition.”

comment ii: Neither the Northwest Forest Plan, nor the 1937 O&C Act, require you to log the mature and old-growth forests in the planning area, now. Support for considering an alternative that defers harvest of mature and old growth forests is contained in the Biological Opinion rendered by the USFWS for the NWFP which states: "Past timber harvest throughout the range of the spotted owl has resulted in a situation where the current amount and distribution of habitat in LSRs and the matrix is of special importance in the short term (30-50 years) because it is key to the movement of spotted owls between existing NRF habitat in and between LSR blocks" (USDA and USDI 1994aVol. II, Appendix G, p18).

Consideration a "thinning in managed plantations only" alternative is further supported by the following:

a. "The [O&C] Act does not require the Secretary [of the Interior] to harvest all old-growth timber nor all commercial timber as rapidly as possible or according to any particular schedule" (Medford BLM RMP 1995 page 17).

b. "Manage toward a mix of stand conditions and seral patterns with consideration to three levels of scale: physiographic province (river basin/mountain range), landscape block (watershed), and within stand detail." (Medford BLM RMP 1995 page 187).

In any alternative that considers the harvesting of mature and old-growth forests, the Westside EA must ***consider the 1937 O&C Act's requirement to cut timber only "in conformity with the principal of sustained yield..."*** *To consider if the BLM has exceeded the sustained yield principal, the EA should disclose an approximate board foot of volume on O&C lands in 1937, and compare that to the volume that exists today. If there is less board feet on O&C lands today, the BLM can not harvest any more at this time.*

Please consider "An Analysis of the "Oregon Lands Revestment Project" (A Proposal of the Association of O&C Counties)" by Neale Hyatt, September 4, 1995. (ask me if you need a copy). Using O&C Timber Inventory from Draft BLM Plans (1988 data), Hyatt estimates there were 104,776,617,900 board feet of volume on O&C lands in 1937. Yet today, there is only about 36 billion board feet of conifers left on O&C lands. These figures demonstrate the BLM have not been managing the O&C lands "in conformity with the principle of sustained yield" as required by the O&C Act. Please consider this in the EA in support of a thinning-only alternative.

While we were traveling through some of the project area we noticed some of the units had a healthy ***understory of canyon live oak****. These beautiful understory trees are an important wildlife habitat. Regeneration harvest units will destroy this habitat. The picture attached to this email was taken in unit 5-1.*

The Westside project is close to the Sudden Oak Death quarantined area managed by Coos Bay BLM. The Medford BLM should consider saving all oak habitat from disturbance. This would afford the greatest genetic defense against the spread of SOD.

<u>BLM Response:</u>

a) The Medford RMP (p. 9) provides management direction for old-growth and mature forest habitat. Of the total 859,096 acres of Medford BLM managed lands, 497,500 acres are to be managed for retention and development of older forest (LSRs, riparian reserves and other lands not available for timber harvest). The RMP identifies that lands available for scheduled timber harvest total 191,000 acres. Given the amount of acres available for harvesting, there is no risk of rapidly cutting old growth or commercial timber on Medford BLM managed lands.

The WA (p. 36) states that "[t]here are currently 13,248 acres of late-successional habitat within established reserves, representing 29 percent of the federal forest lands… This indicates that even if all the GFMA lands were logged, there would still be more than the required 15 percent of the federal forest lands in the watershed in a late-successional habitat condition."

b)The 104 billion board feet estimate of total standing inventory volume on BLM lands made by Mr. Hyatt is based on the flawed assumption that all of these lands were in an old growth condition in 1937.

Over the history of the BLMs management of the O&C lands inventories have been conducted regularly and this information was been utilized in the determination of the annual productive capacity of these lands for timber production. The current plans utilized current inventory data in determining the annual productive capacity and the sustainable harvest levels. The sustainable harvest level is determined at the RMP level of the planning process.

Background for the Response

1) False Premise – All BLM Lands Were Old Growth in 1937

Mr. Hyatt's methodology for estimating the total standing volume in 1937 is outlined on page four of his report. He utilizes the average volume per acre of current Old Growth stands for each district times the number of acres in each district. This approach is based on a flawed assumption that in 1937 that all of the acres of BLM lands were in an Old Growth condition.

- The USGS 1900 map of vegetation of Oregon which represents condition before any land management activities indicated approximately 50% of the BLM lands were in Old Growth condition. (2005 BLM Analysis of Management Situation – Ecology Section).

- The age class distribution for western Oregon at the time of the RMPs (1992) indicated that approximately 40% of the forested lands are in stands 60 years and older but less than 200 years and older (Old Growth). These stands are not old growth today nor were they in 1937.

2) Inventory Estimates of Total Standing Volume.

In response to an inquiry from Oregon Natural Resource Council in 1995 Jim Alegria, BLM/FS regional biometrician, examined previous BLM inventory estimates of the total standing inventory. These estimates were based on measured plot data across all districts. Although the utilizations standards and methodology of these inventories varied over time it indicated a fairly consistent picture.

Inventory Vintage	Total Standing Volume Billion Board Feet
1940	46
1960	49
1970	50
1980	47

1990	50

It is anticipated that a revised estimate will be produced from the Current Vegetation Survey (CVS) inventory data for the Western Oregon Plan Revisions.

3) Managing in Conformance with Sustained Yield

The O&C act states:

> Annual productivity capacity will be determined and declared.
>
> Timberlands… shall be managed for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principle of sustained yield...

The **Forest Ecosystem Management Assessment Team** (FEMAT) definition of Sustained Yield is:

> The yield that a forest can produce continuously at a given intensity of management.

How do we manage in conformance with Sustained Yield under the RMP?

> The determination of the annual productive capacity is based upon the calculation of the Allowable Sale Quantity. In this calculation the current forest inventory is used to project over many hundreds of years the management practices outlined in the plan to demonstrate the harvest levels are sustainable. With plan revisions and new inventories the annual productive capacity is reassessed and is declared in the Record of Decision for the next implementation period.

Given that prior to the NFP the BLM was enjoined and not harvesting timber and under the NFP 80%+ of the lands have been managed for late-successional forest objectives, and the harvest rates in the Matrix have not met anticipated levels over the last decade it could be expected that we are gaining in standing inventory over previous estimates.

Canyon live oak is not a rare species and is generally abundant on warm, dry sites in the understory or in the open. It generally does not form pure stands and is more commonly associated with ponderosa pine, Douglas- fir and incense-cedar and therefore does not occupy a unique habitat as a plant association in southern Oregon. It has a long persistence on a site because it is a vigorous sprouter after disturbances such as fire and harvesting. Some of these resprouts are hundred of years old. To maintain larger hardwoods on site, the Westside EA specifies that 3-5 hardwood tree species per acre would be retained after harvesting.

Rough & Ready Lumber Company

comment jj: "Rough & Ready would like to strongly encourage the BLM to proceed with their proposed action, which would supply a much-needed quantity of wood fiber into markets that have been anemic of reliable government wood in the recent past. Management of these forests will greatly increase their health and help to make them more resilient to catastrophic stand replacement events."

<u>BLM Response:</u> We acknowledge your concern and have addressed that in the purpose and need section of the EA. The Proposed Action balances the dual need for a healthy forest ecosystem and the need for sustainable supply of timber for local and regional economies (RMP, p. 4).

David Mildrexler

comment kk: Opposes building 10 miles of new roads and clearcutting 1,000 acres of mature and old-growth forests. "I am totally opposed to this project because it destroys the forest structure and wildlife habitat that I WANT in Oregon."

BLM Response: See response to comment "cc" regarding clearcutting and response to comment "a" and "b"' for directives from the Northwest Forest Plan and Medford Resource Management Plan for timber production. See response to "f," "o," and "p" regarding roads.

Catherine Porhammer

comment ll: Nearby resident concerned about harvesting in extreme southern boundary of Planning Area that faces her property. I would like you to consider coordinating that parcel with the wildlife corridor presented by Mr. Bornstein.

<u>BLM Response:</u> The BLM land that faces your property is under the land allocation of matrix. It is also within Medford RMP Visual Resource Management IV classification allowing management activities that may dominate the view. See response to "b," "d," and "aa."

Roxy Hill, George Hutchinson, Bill Black, Lydia Garvey, Joe Kuehn, Tyga Hunter, Susan Applegate, Peg Reagan, Tom Peil, Arthur Skeach, Jeanne Prendergast, Jeanne Riha, Josh Schlossberg

comment mm: Stay out of old growth forests

<u>BLM Response:</u> See response to comment "a" regarding the decision to log old-growth forests.

Marcia Rodine

comment nn: Refrain from logging spotted owl habitat, consider alternative with no regeneration harvesting, refrain from building new roads.

BLM Response: see responses to “a,” “b” regarding logging and “f,” “o,” and “p” regarding roads.

William O’Leary

comment oo: Supports thinning to reduce insect damage and fire risk. BLM road 32-5-23-1 is in bad shape needs to be repaired and gated.

BLM Response: Road 32-5-23-1 is outside of the Westside Planning Area.

Becki Kammerling for Cascadia Wildlands Project

comment pp: The proposed project calls for 2,600 acres of land to be logged, leaving a mere 7-10 large conifers per acre. In addition this project intends to create 10 additional miles of road in an area that already has permanent damage from roads. These are not insignificant actions on our public lands.

BLM Response: Your figures are incorrect. The Westside Project EA proposes 1,515 acres of regeneration harvest and overstory removal that would leave 6-8 trees of large (>20” dbh) conifers per acre. An additional one to two trees would be left standing for coarse woody material. The photo below is taken of Unit #3 of the Lost Fortune Timber Sale, in the foreground, that is within the Westside Planning Area. Approximately 10 large

Trees per acre are retained in this overstory removal harvest unit.

The effects were analyzed in the Westside Project EA and did not substantiate any significant impacts beyond those analyzed in the *Medford* RMP/ROD and higher level EISs to which the analysis is tiered. Your public lands also belong to those who believe at least a portion of public lands in the Medford District should be producing a “reliable” supply of timber; 78% of the NFP landscape is already providing you with public land that is not managed for timber production; the public that desires the economic and ecological benefits timber harvest only has 22% of the public land devoted to their interests. While you may desire to also have that 22% of public land devoted to your interest, the “balance” that the NFP struck between your interest, and the interest of those who desire timber harvest, was unprecedented. An EIS was already prepared to examine the “significance” of devoting timber resources and public land to balancing your interest, with the interest of the other members of the public with competing values.

The Westside Project EA analyzes the effects of roads and will issue a Decision and determination on whether there are significant effects.

comment qq: It is well known that the larger trees are not as flammable as smaller stands, and that logging these trees creates more fuel on the forest floor creating a higher risk of forest fire.

<u>BLM Response:</u> At the stand level, the concern seems to be that younger trees are more susceptible to fire than older trees. This is generally true because younger trees are smaller, both in height and diameter, than older trees and therefore require a lesser degree of fire intensity and shorter flame lengths to sustain lethal damage from fire (Agee, 1993).

At the landscape level, the concern seems to be that the existence of plantations may create the potential for catastrophic fires. The probability of this concern occurring is heavily dependant on many spatial and temporal variables, such as the location of the plantations in respect to slope, aspect, elevation, and position on slope, along with weather conditions occurring as the fire ignites and advances. Other critical factors in catastrophic fire development relate to the availability of fire suppression resources, their response time to the fire, and their effectiveness given the environmental factors present.

Plantations, although they may present an area with increased fire rates of spread due to the presence of flashier fuels, may also provide areas in which effective and efficient fire suppression operations can occur (Martin, 2006). For example, air attack operations with air tankers and helicopters are generally less effective in stands with taller trees and closed canopies. Also, access through managed areas is already in existence, meaning mechanical equipment such as dozers can be used in a much more efficient manner. Existing fire barriers, such as roads and firelines, may also already exist in managed areas, meaning fire control lines take less time construct than in older stands, in most instances (Martin, 2006).

Scientific evidence exists supporting the notion that plantations are vulnerable to fire and may exacerbate fire behavior, particularly during times of dry conditions and in stands that have received slash-producing maintenance treatments (such as pre-commercial thinning) where the slash remains on site and is not mitigated (Martin, 2006). However, in most instances, monitoring plots taken in older stands in the local area reveal that the number of small trees (up to 8 inches dbh) with varying heights are at such levels of abundance that these stands are also vulnerable to fire and have the potential to produce catastrophic fire behavior during dry conditions (Martin, 2006). As Chart 3-1 in Chapter 3 of the EA shows, the high end of the range for flame lengths in mature stands (8 feet) exceeds the high end in early seral stands (7 feet) and mid-closed stands (3 feet) that are indicative of plantations.

comment rr: The CWP requests that the BLM analyze the impacts of this project on fire hazards and erosion, and create alternatives that do not contradict the objectives of the RMP, violate NEPA or the NFP.

<u>BLM Response:</u> Both action alternatives were developed to conform with the RMP and NFP and follow the disclosure requirements for NEPA. The impacts of the alternatives on fire hazard and erosion is found under Chapter 3 under the Soils, Hydrology and Fisheries section and the Fire section.

comment ss: New information on the threatened northern spotted owl indicates that there are significant new uncertainties for the owl that have not been fully considered by the Forest Service or BLM at the regional or local scale.

<u>BLM Response:</u> See response to comment "w" regarding new information on the northern spotted owl.

comment tt: The BLM is required under the NFP to assess the effects of a project on management indicator species. C.F.R. 219.19(a)(6) requires that "planning alternatives shall be stated and evaluated in terms of both amount and quality of habitat and of animal population trends of the management indicator species." Idaho Sporting Congress inc. v. Rittenhouse, 232 F3d 894, 972 (9th Cir. 2000) 972.

<u>BLM Response:</u> The case you are citing is with the Forest Service. *C.F.R. 219.19(a)(6)* is a Code of Federal Regulation for the Forest Service, not the Bureau of Land Management. The Northwest Forest Plan does not use the term "indicator species."

comment uu: We explicitly request the development of an alternative that does not log trees greater than 17" DBH, one only allows appropriate thinning of plantation stands, one that protects riparian habitats, all endangered, threatened, and sensitive species.

<u>BLM Response</u>: The BLM is not aware of the biological significance of 17" DBH trees. See response to comment "b" and "p" regarding the purpose and need of this project and obligations to the O&C Act. The No Action Alternative is analyzed in the Westside that includes many of your concerns regarding harvesting. See Chapter 3 and Appendix 2 for effects on endangered, threatened and sensitive species.

Curt Christian for Fir Point Bible conferences

comment vv: Concern from noise from logging operation during June through Labor Day and then October 12-22 when our facility is used by rental groups for resident camps.

BLM Response: BLM is considering the timing of helicopter use in a mitigation measure to the EA.

comment ww: Group selection or regeneration harvest type logging would impact the canopy thereby impacting the quantity and quality of our water supply.

BLM Response: Project design features are identified in Chapter 2 of the EA that are intended to buffer streams from sedimentation and increases of water flow, such as 185' stream buffers. Effects of management activities on peak flows and erosion are analyzed under Chapter 3 of the Westside EA.

APPENDIX 4
WESTSIDE LANDSCAPE PROJECT
SILVICULTURE PRESCRIPTION

Introduction

The Westside landscape project proposes timber harvest, forest and stand development treatments, fuels reduction treatments, and follow-up vegetation treatments (e.g., site preparation, planting of conifers, maintenance treatments, protection treatments, spacing of residual regeneration, and associated treatments to reduce activity fuels) in 88 units within the Middle Cow Creek watershed.

The stands in this Planning Area can be classified as mixed conifer and fall into the following plant associations: Douglas fir, white-fir and tanoak. The Douglas fir series is the predominant series in this Planning Area. The primary species in the project is Douglas fir with a lesser percentage of ponderosa pine, sugar pine, white-fir, western hemlock and incense cedar. Hardwood and shrub species include, but are not limited to: Pacific madrone, California black oak, Oregon white oak, golden chinquapin, tanoak, Oregon ash, big-leaf maple, canyon live oak, rhododendron, salal, dwarf Oregon grape, Piper's Oregon grape, baldhip rose, vine maple, poison oak, oceanspray, California hazel and hairy honeysuckle.

Land Use Allocation Objectives:

Matrix land (Connectivity Blocks included): This Planning Area is contained entirely in the Northern General Forest Management Area (Northern GFMA). The objective of Matrix land is as follows:

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Provide early-successional habitat.
- Provide connectivity between late-successional reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags, and large trees.

Riparian Reserves: The objectives of riparian reserves are as follows:

- Follow the Aquatic Conservation Strategy objectives (from RMP pages 22-23)
- Provide habitat for terrestrial species associated with late-successional forest habitat.
- Provide dispersal habitat for the northern spotted owl.

- Implement strategies to achieve the goals established in the BLM's Riparian Wetland Initiative for the 1990's.

Specific Unit Objectives:

Commercial Thinning (CT): 3-10, 3-8, 3-11, 4-8, 5-27, 5-4, 8-1, 8-2A, 9-1, 9-2, 9-18, 17-1, 18-14, 19-1, 19-2, 1-1, 13-1, 13-3, 24-5, 23-3, 23-5, 11-2W, 11-3W, 3-4W, 21-7, 22-2, 27-6, 27-3, 34-1, 34-3, 35-1, 31-1, 31-8, 5-8S, 5-9S, 5-10S, 5-21S, 4-3S, 4-19S, 4-21S, 4-20SA, 33-2C

The objective of Commercial Thinning treatments within these units is to reduce stand densities so that competition is reduced on the retained trees for light, water, nutrients and growing space. This treatment would promote better stand health, as well as increased vigor and better crown development on retained trees. Fewer, larger trees would make up these stands in the long term and overall stand health would be improved. Insect areas would be removed entirely or the stand would be left in a healthier condition to combat these infestations. Production of some wood volume at the present time and an increase/maintenance of growth rates for wood volume production in the future are primary objectives.

Regeneration Harvest (RH): 10-1, 17-4, 5-7S, 33-2A, 3-11SW, 20-1, 21-8, 21-15, 14-2W, portion of 24-4, 31-3, 4-24, 5-1, 5-26, 5-12, 5-15, 5-14, 15-1, 5-2W, 29-1W

The objective of this treatment is to replace existing older mature stands with ones of vigorous growing younger stands of conifers. This treatment would also retain a hardwood component, provide for the future recruitment of coarse woody debris and retain green conifers in the stand. Retained trees would meet the RMP requirement for green tree retention (6-8 trees/acre). An additional 1-3 trees/acre would be retained to meet coarse woody material objectives as well as future snag recruitment. Production of wood volume is a primary objective in this treatment.

Overstory Removal (OR): 3-19, 4-33, 9-17, 5-18, 8-2, 3-1W, 5-2W, 34-2, 27-1, portions of 15-2, 4-20, 5-7S

The objective of this treatment is to replace existing older mature stands with ones of vigorous growing younger stands of conifers, while placing an emphasis on retaining existing conifer regeneration throughout the units. This treatment would also retain a hardwood component and provide for the future recruitment of coarse woody debris. Existing conifer regeneration would be released and would become part of the next stand. Retained trees would meet the RMP requirement for green tree retention (6-8 trees/acre). An additional 1-3 trees/acre would be retained to meet coarse woody material objectives as well as future snag recruitment. Production of wood volume is a primary objective of this treatment.

<u>Regeneration Harvest/Commercial Thinning (RH/CT)</u>: 21-15 and 15-9

The objective of this treatment is to replace existing older mature stands with ones of vigorous growing younger stands of conifers, while placing an emphasis on commercial thinning of smaller diameter timber (<20" DBH) to promote a healthy and vigorously growing stand. Smaller diameter trees would be spaced to reduce stand density so competition is reduced on the retained trees for water, light, nutrients and growing space. Retained trees would meet the RMP requirement for green tree retention (6-8 trees/acre). An additional 1-3 trees/acre would be retained to meet coarse woody material objectives as well as future snag recruitment. The production of wood volume is a primary objective of this treatment.

<u>Regeneration Harvest/Commercial Thinning/Pine Restoration (RH/CT/Pine Rest)</u>: 33-2B, 23-2, portion of 15-2, portion of 24-4, 21-15A

The objective of this treatment is to replace existing older mature stands with ones of vigorous growing younger stands of conifers, while placing an emphasis on retaining pine and cedar species. Many of these sites have been encroached upon by white-fir and Douglas fir and have caused pine and cedar species to drop out of the stand. Smaller diameter trees (<20" DBH) would be spaced to reduce stand density so competition is reduced on the retained trees for water, light, nutrients and growing space. Pine and cedar regeneration would be preferred on these sites for pre-commercial thinning and planting. Retained trees would meet the RMP requirement for green tree retention (6-8 trees/acre). An additional 1-3 trees/acre would be retained to meet coarse woody material objectives as well as future snag recruitment. The production of wood volume is a primary objective of this treatment.

<u>Overstory Removal/Commercial Thinning (OR/CT)</u>: 3-5, 3-5A, 9-6, 9-19, 17-7, 18-12, 4-20S, 15-8, 10-1W, 10-2W, 29-3W, 3-8SW

The objective of this treatment is to replace existing older mature stands with ones of vigorous growing younger stands of conifers, while placing an emphasis on retaining existing conifer regeneration throughout the units. Smaller diameter timber (<20" DBH) would be spaced to promote a healthier more vigorously growing stand. Competition for light, water, nutrients and growing space would be reduced on retained smaller diameter timber. This treatment would also retain a hardwood component and provide for the future recruitment of coarse woody debris. Existing conifer regeneration would be released and would become part of the next stand. Retained trees would meet the RMP requirement for green tree retention (6-8 trees/acre). An additional 1-3 trees/acre would be retained to meet coarse woody material objectives as well as future snag recruitment. Production of wood volume is a primary objective of this treatment.

<u>Sanitation/Root Rot</u>: 9-1A

The objective of this treatment is to contain and eventually stop an area of laminated root rot in this unit. Infected trees as well trees adjacent to this outbreak center are to be removed. All other timber in this unit would be commercially thinned to promote a healthier and more vigorously growing stand. Competition for light, water, nutrients and growing space would be reduced on the retained trees. Resistant planting stock would be planted in this disease area to provide for reforestation of the site. Production of wood volume is not a primary objective of this treatment.

<u>Selective Tree Harvest</u>: 11-1

The objective of this treatment is to remove certain species to balance out species composition and trees in a state of decline from the stand. The stand would exhibit a healthier overstory then what is currently there, as well as remove suppressed and poorly formed trees from the understory of the stand. Young, vigorously growing conifers would replace the older decadent trees that were removed. The stand would also exhibit a multi-layered canopy with canopy gaps and areas of no treatment (retention).

<u>Shelterwood Retention</u>: 25-1

The objective for this treatment is the first entry, or a preparation cut, for a shelterwood retention system. The objective is to remove approximately half of the overstory trees and promote a young vigorously growing stand of conifers in the understory. This treatment is proposed to meet the Visual Resource Management II (VRM II) requirements for the Interstate 5 corridor as stated in the RMP (page 70). Once the understory develops enough to meet the visual requirements of VRM II, the stand would be entered again and the overstory trees would be reduced. Production of wood volume is a primary objective for this treatment.

<u>Riparian Treatment Areas</u>: 17-1, 9-1, 9-18, 31-1, 31-8, 1-1, 33-2C, 3-11, 13-1, 13-3, 9-2, 5-8S, 5-10S, 4-3S, 4-19S, 27-3, 19-1, 11-3W, 21-7, 22-2, 23-3, 23-5, 27-3, 27-6, 3-10, 3-8, 4-20SA, 4-8, 5-4, 8-1, 11-1

The objective of these treatments is to create a stand that is on a trajectory to reach a late-successional condition. Many of these units are dominated by smaller diameter stands of Douglas fir and some hardwoods. Most stands are lacking large wood debris, downed logs, and large tree structure. The treatment would reduce competition on the retained trees for light, nutrients, water and growing space. These trees would develop larger canopies, display better vigor and put on diameter growth faster then if left untreated. Canopy gaps would also be created in these zones to promote multiple-layered stands and promote species diversity that is a key element in late-successional habitat. Production of wood volume is a bi-product of this treatment, but is not a primary objective.

<u>Effects of Proposed Treatments</u>

Vegetation Effects – Short Term (0-10 years)

Stand Condition	No Treatment	Commercial Thinning	RH, OR, OR/CT, RH/CT
Vigor	Remain the same to decrease	Remain the same to increase	Remain the same to increase on retained trees as well as regeneration
Growth Rate	Remain the same to decrease	Remain the same to increase	Remain the same to small increase on retained trees
Live crown ratio	Remain the same to decrease	Remain the same to increase	Remain the same to increase on retained trees
Conifer species	Remain the same to slight decrease	Increase	Increase due to planting of site adapted conifer species
Hardwood species	Remain the same to decrease	Remain the same to increase slightly	Decrease
Shrubs/brush/forbs	Decrease	Remain the same to increase since more light is in the understory	Increase
Snags	Increase due to mortality	Remain the same then decrease	No change to decrease due to falling of snags for safety reasons and removal of trees that are dying
Coarse woody debris	No change to increase	Depending on fuels treatment, increase or decrease	No change to possible increase if cull logs are left

Vegetation Effects – Long Term

Stand Condition	No Treatment	Commercial Thinning	RH, OR, OR/CT, RH/CT
Vigor	Decrease	Increase	Dependant upon future stand management
Growth Rate	Decrease	Increase	Dependant upon future stand management
Live crown ratio	Continued decrease	Increase	Dependant upon future stand management
Conifer species	Remain the same to slight decrease	Increase once stand develops different canopy layers	Increase due to vegetation management
Hardwood species	Remain the same to decrease	Remain the same to increase slightly	Decrease due to vegetation management activities
Shrubs/brush/forbs	Decrease	Decrease eventually once canopy closes	Increase then eventually decrease as canopy closes
Snags	Increase due to mortality, small diameter though	Decrease	Increase once large overstory trees die
Coarse woody debris	Increase, but mainly small diameter	Increase slowly due to mortality of now larger trees	Eventual increase once large retained overstory trees die and fall

The above table is dependant on many different factors that may or may not be foreseen in the distant future. The processes that shape the way these stands would appear in the future are dependant on many factors. Fire, insect and disease, drought and availability of funding for thinning and vegetation management activities all are going to be factors in the long term development of these stands.

UNIT 13-1 T.32S., R6W., section 13

Stand Description: Unit 13-1 consists of a two storied stand consisting of an overstory of scattered large incense cedar 30”-60” DBH and an understory of incense cedar and Douglas fir generally ranging in size from 8”-24” DBH. There is scattered sugar pine, ponderosa pine, and white-fir found throughout unit. Basal area ranges from 160-340 ft^2. Many suppressed trees are present as well as a majority of the trees have a live crown ratio of 30% or less. Canopy closure is approximately 80%. A hardwood component of Pacific madrone and chinquapin is present with diameters ranging from 7”-16” DBH, with a few larger madrones up to 24” DBH found. The ridge contains some large ponderosa pine (16”-30”DBH) mixed with incense cedar. Groundcover consists of salal, dwarf Oregon grape, ferns, rattlesnake plantain, tanoak and bear grass. The later two are found towards the ridge while the others are found within the riparian influence zone.

Analysis: This area is Matrix land. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees. The trees in this stand are capable of responding to a release treatment.

Desired Future Conditions/Results: Short term future conditions would a stand opened to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain two storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Pine would come back into the unit where it has been dropping out. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: Commercial thinning (CT) is the recommended treatment for this unit. Thin to retain approximately 100 ft^2 basal area with dominant and co-dominant trees retained. Clumps of larger trees should be spaced where they are found. Thin around large single ponderosa, sugar pines and incense cedars 25’ off of the drip line. Thin clumps of large pine and cedar with a target retention of canopy closure at 30%-40% (80 -100 ft^2). Pre-commercial thin conifer regeneration to 14’x14’ spacing. On east portion of unit, girdle hardwoods up to 12” DBH to promote the release of understory conifer regeneration. Slash all tanoak 1”-7” DBH. Unit would be assessed post-harvest for planting and fuels treatment needs. Fuels treatments may include burning of piles and/or under burning.

UNIT 13-3 T.32S., R6W., section 13

Stand Description: Stand consists of a mixed conifer stand of Douglas fir and white-fir 8”-24” DBH, with scattered incense cedar 24”-36”DBH. Basal area is generally 160-260 ft^2. The south end of unit consists of mainly chinquapin and tanoak with very little conifer regeneration present. The understory consists chinquapin and dogwood with very little conifer regeneration throughout. Ground cover is indicative of a moist site with salal, dwarf Oregon grape, hazel, and occasional tanoak. Live crown ratios are 50% for dominant trees with intermediate and suppressed trees around 30%. There are areas of blow down evident in southern end of stand.

Analysis: This area is Matrix land. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees. This stand is capable of responding to a release treatment.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain two storied. Conifers would be growing much more vigorously in areas where hardwoods are suppressing growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Pine would come back into the unit where it has been dropping out. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: Thin areas of blowdown to a closer spacing to prevent addition expansion of these areas.

Recommended Treatment: Commercial thinning (CT) is proposed for this unit. Thin to retain approximately 100 ft^2 of basal area with dominant and co-dominant trees retained. Clumps of larger trees should be spaced where they are found. Thin around large single Ponderosa, sugar pines and incense cedars up to 25’ off of the drip line. Thin trees adjacent to blowdown areas to approximately 120 ft^2 of basal area. Retain this higher basal area for approximately two tree lengths. Pre-commercial thin non-merchantable conifers to a 14’x14’ spacing. On south portion of unit, girdle hardwoods up to 12” DBH to promote the release of understory conifer regeneration. Slash all tanoak 1”-7” DBH. A post-harvest assessment for fuels and planting needs would be done.

UNIT 24-4 T.32S., R6W., section 24 T.32S., R5W., section 19

Stand Description: This unit contains a previous Hi Five thin (unit 4A). The unit consists of a mixture of Douglas fir, ponderosa and sugar pine ranging in diameter from 20”-50” DBH. There are a few scattered white-fir and smaller incense cedar found throughout the unit. The east portion of unit contains a larger percentage of ponderosa pine and incense cedar then the rest of the unit. Live crown ratios average approximately 30%. The west portion of unit is generally a pure Douglas fir stand. Understory species consist of big Leaf Maple, Pacific madrone, and hazel. Large California black oak is found on the ridge top. There are a few pockets of Douglas and White fir regeneration sparsely scattered throughout the unit. Ground cover consists of grasses, hairy honeysuckle, and areas of conifer regeneration.

Analysis: This area is Matrix land. The stand meets RMP guidelines for Regeneration Harvest (RH). The culmination of mean annual increment has been reached. Thinning canopies and pockets of conk are indicators that this stand is declining.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir with scattered ponderosa and sugar pines. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this two story structure for the long term.

Avoidance Strategies: Mark to retain 1-2 extra trees in the saddle to prevent addition expansion of a blowdown area.

Recommended Treatment: The recommended treatment for this unit is a Regeneration Harvest/Pine Restoration (RH/Pine Rest). The east portion of the unit would be Pine Restoration. Retention of the larger ponderosa pine and incense cedar is desired in this portion of the unit. The remainder of the stand is RH with 7-10 trees per acre retained. . Retain the sugar pines that are found in the unit. Remove all the white-fir from the stand. The saddle in the north portion of the unit has experienced blow down recently, and it is recommended to leave 1-2 extra trees in this area to prevent further expansion of the blow down area. Spacing in this area should be about 60’x60’. The large black oaks should be retained and protected from damage. Pre-commercial thin conifer regeneration to a spacing of 14’x14’. Assess unit post-harvest for fuels and planting needs.

Unit 1-1 and 1-2 T. 32S R. 6W Section 1

<u>Stand Description</u>: The stand consists of a second growth stand of mainly Douglas-fir with areas of white-fir, incense cedar, and scattered sugar pine. Diameters range from 8"-32" DBH. Canopy closure is 80%-90% for the majority of the unit. There are two areas of previous harvest that were part of the McLawson timber sale (Units 1 and 2). These areas have a canopy closure of approximately 50%-60%. Live crown ratios are 20%-30% throughout the stand with many suppressed trees and broken tops or poor formed trees. The western portion of unit 1-1 has a relatively pure stand of white-fir. The north-eastern portion of 1-1 has some scattered western hemlock. Basal area in the stand is 200-300 ft^2. The understory consists of Pacific madrone, chinquapin, alder and Douglas-fir regeneration. A few areas on the southerly aspects have canyon live oak and there is a very small area of rhododendron. The ground cover consists of salal, ferns, dwarf Oregon grape, hazel, rattlesnake plantain, and a very small percentage of tanoak. Many of the smaller diameter hardwoods have been shaded out and are dead.

<u>Analysis</u>: This section is designated matrix land, but is allocated as a connectivity block. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees. The treatment would also promote a varied stand in both size and age classes. Species diversity would be maintained throughout.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Canopy gaps and retention "island" would provide structure and age class distribution across the stand. Non-commercial sized conifers would be spaced more evenly and the stand would be multi-storied.

Long term conditions would be better stand vigor and better canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in the stand longer.

<u>Recommended Treatment</u>: Commercial thinning (CT) is the recommended treatment for this unit. Mark to retain 100 ft^2 of basal area, removing suppressed and poorly formed trees. Leave larger scattered residual Douglas fir and incense cedar for structure in the Connectivity Block. In the center portion of the unit (helicopter yarding area) create small openings (Group Selections) of 1/2 acre to create openings and to promote a multi-storied stand. Space these openings near the margins of stands of larger/older trees. Place 6-10 of these openings in this area, but do not locate these openings closer then 200' apart. Locate 3-4 ½ acre leave-islands in this central portion of the unit as well. Mark all the trees inside of these "islands" for leave. Space these islands and the group selection areas so they are spread evenly across the unit. Mark for retention a representative percentage of species that are naturally present in the stand. Pre-commercial thin conifer regeneration to 14'-20' spacing to provide for variability in the stand. Assess the unit post-harvest for fuels and planting needs.

Unit 31-8 T. 32S R. 5W Section 31

Stand Description: This unit consists of a second growth stand of Douglas fir, incense cedar and white-fir. Diameters range generally from 8”-36” DBH. Canopy closure is about 70% and live crown ratios are generally around 30%. There are a few residual larger Douglas fir and incense cedar remaining in the stand. The northern portion of the unit is comprised of a large percentage of white-fir. Much of the smaller pole sized (5”-11” DBH) white-fir is suppressed or dead. Basal area throughout the unit is 160-300 ft^2. The understory consists of Pacific madrone, tanoak, big leaf maple, chinquapin, hazel, vine maple and dogwood. There are areas of quality conifer regeneration, but as a whole not found consistently throughout the unit. Ground cover consists of tanoak, dwarf Oregon grape, Salal, ferns, and rattlesnake plantain.

Analysis: This unit is designated Matrix land. This stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Avoidance Strategies: none

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Thin to retain 100 ft^2 of basal area, removing suppressed and poorly formed trees and leaving the larger dominant and co-dominant trees. Favor Douglas fir and incense cedar over white-fir. Thin around larger residual trees removing the suppressed trees from underneath. Assess the unit after harvest for planting and fuel treatment needs. Fuels treatments may include piling of brush and slash and burning piles. Follow-up treatments may include underburning as well.

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Unit 4-19S T. 33S R.5W Section 4

Stand Description: This unit consists of a second growth stand consists of Douglas fir and incense cedar generally 8”-30” in diameter. Basal area in the stand ranges from 160-240 ft^2. Canopy closure is 70% and live crown ratios are 20%-30% on many of the trees in the stand. The stand contains many suppressed trees and broken tops. The understory consists of canyon live oak, conifer regeneration and some hazel. Much of this unit has a large component of canyon live oak and brush. Much of the unit has very little merchantable timber in it.

Analysis: This unit is designated Matrix land. This stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Avoidance Strategies: none

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would become a two storied stand with larger overstory trees and new conifer growth in the areas where brush once occupied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Thin to retain 100 ft^2 of basal area, removing suppressed and poorly formed trees. Favor retaining the larger trees as well as the pines present on the ridge. Slash areas of brush and canyon live oak to release the conifer regeneration. Pre-commercial thin areas of quality conifer regeneration to a 14’x14’spacing. Assess the unit post-harvest to determine planting and fuels treatment needs.

Unit 4-3S T. 33S R.5W Section 4

Stand Description: This unit consists of a second growth stand of Douglas fir, incense cedar and white-fir ranging in diameter from 6”-20” DBH. The unit is very patchy with areas of conifers and large areas of hardwoods and brush. Some areas are well stocked with basal areas ranging from 200-300 ft^2. Other areas are poorly stocked with basal areas of 100-160 ft^2. Canopy closure is 90%-100% in areas of good stocking. Live crown ratios are 20%-30% in much of the stand. There are a few areas of off-site ponderosa pine located in riparian influence areas. These trees are small diameter (3’-7”DBH) and have poor form or low live canopy ratios (15%-25%). The understory consists of canyon live oak, tanoak, hazel, Pacific madrone and areas of big leaf maple, dogwood and alder.

Analysis: This unit is designated Matrix land. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees. The treatment would also reduce the hardwood component and promote conifer growth and varied stand structure over a larger area.

Avoidance Strategies: Site preparation and site maintenance over time is to be completed to reduce the stocking levels of hardwood and brush species.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would become a two storied stand with larger overstory trees and new seedlings in the areas where brush once occupied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. Reduction of hardwoods and larger areas of conifer production would also be a long term future condition.

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Mark to retain a basal area of 100 ft^2, leaving larger and healthier trees, removing suppressed or poorly formed trees. Favor Douglas fir and incense cedar, removing single or small groups of white-fir where possible. Much of unit would need extensive site preparation. These treatments may include: slashing, girdling and piling of slash and burning piles. Pre-commercial thin conifer regeneration, favoring Douglas fir and incense cedar regeneration, to a spacing of 14’x14’. Slash off-site pine in Riparian areas, leaving other conifers(DF+IC) in the understory. Eventually a second entry would be needed to remove the overstory of pine to be replaced by the understory of Douglas fir and incense cedar.

Unit 4-21S T.33S R.5W Section 4 and T. 32S R. 5W Section 33

Stand Description: This unit consists of a single storied stand of larger Douglas fir with diameters ranging from 12"-40"DBH. Area had evidence of a previous fire that most likely replaced the stand about 90 years ago. Basal area ranges from 180-280 ft^2. Canopy closure of the stand is 60%-70% and live crown ratios are around 50%. This stand is showing vigorous growth throughout the diameter classes. There are a few suppressed and dying smaller diameter trees in the understory. Overall, there is very little conifer regeneration present in the unit. The understory consists of canyon live oak, some being shaded out, and some already dead. The ground layer consists of manzanita, canyon live oak, and rattlesnake plantain. Manzanita bones are present throughout the unit.

Analysis: This unit is designated matrix land. This stand currently meets RMP guidelines for Regeneration harvest. Much of this unit is located in a Connectivity Block. The stand is showing very good incremental growth, so a regeneration harvest has been deferred until the next harvest treatment. This stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Avoidance Strategies: none

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would become two storied and conifers would be growing much more vigorously in areas where manzanita is suppressing or preventing growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer trees would make up the canopy, but they would be on the large end of the diameter class. The treatment would also promote regeneration in the understory.

Recommended Treatment: Recommended treatment for this unit is Commercial Thin (CT) to retain a basal area of 80-100 ft^2. The purpose of this thin is to stimulate an understory of conifer regeneration without stimulating a brush component. This would be the first entry into the stand of an eventual Overstory Removal (OR) treatment. Retain larger trees with well developed crowns. Assess the unit post harvest for planting and fuel treatment needs.

Alternative Options Considered: Regeneration harvest was considered for this unit. The stand is showing very good incremental growth, so a regeneration harvest was deferred until an understory of conifer regeneration could be established on this harsher site.

Unit 4-20SA T. 33S R.5W Section 3

Stand Description: This stand is very similar to Unit 4-21S. The overstory consists of Douglas fir and incense cedar ranging in diameter from 14"-30"DBH. There are occasional large 40"+ Douglas fir scattered throughout the stand as well. There is a smaller percentage of canyon live oak in this stand then in Unit 4-21S. Good quality conifer regeneration scattered throughout the stand. Basal areas range from 180-260 ft^2. Ground cover consists of Dwarf Oregon grape, ferns, canyon live oak, and rattlesnake plantain. The canopy closure is 70% and live crown ratios are about 40%. Stand is growing rather vigorously, but not fast as Unit 4-21S.

Analysis: This unit is designated Matrix land. Portions of the stand meet RMP guidelines for Regeneration Harvest (RH), this stand is showing very good incremental growth, so a regeneration harvest has been deferred until the next harvest treatment. This stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Avoidance Strategies: None

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would become two storied and conifer regeneration would be growing much more vigorously.

Long term conditions would be even better stand vigor and better canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer trees would make up the canopy, but they would be on the large end of the diameter class. The treatment would also promote additional regeneration in the understory.

Recommended Treatment: Recommended treatment for this unit is Commercial Thin (CT) to retain approximately 80-100 ft^2 of basal area. The purpose of this thin is to stimulate more of an understory of conifer regeneration. This would be the first entry into the stand of an eventual Overstory Removal (OR) treatment. Salvage larger trees in the western portion of the unit that are showing decline or are dead already. This area of salvage would coincide with unit 4-20S. Retain larger trees with good crowns. Pre-commercial thin conifer regeneration to a 14'x14' spacing. Unit would be assessed post harvest for planting and fuel treatment needs.

Alternative Options Considered: Regeneration harvest was considered for this unit. The stand is showing very good incremental growth, so a regeneration harvest was deferred until an understory of conifer regeneration could be established on this harsher site.

Unit 4-20S T. 33S R.5W Sections 3 and 4

Stand Description: This unit consists of a two-storied stand of large Douglas fir in the overstory and pole sized and smaller Douglas fir and incense cedar in the understory. The overstory is generally 28”-60”DBH Douglas fir and is in poor condition. Much of the stand is in a state of decline, with many trees dead or containing broken or spiked tops. There are numerous snags present throughout the unit. There is one sugar pine in the stand of good quality. The understory consists of canyon live oak, Pacific madrone and good quality conifer regeneration is found throughout much of the unit. Smaller diameter (7”-10”DBH) Douglas fir and incense cedar are scattered throughout the unit as well. Groundcover consists of canyon live oak, ferns, whipplevine, and vanilla leaf.

Analysis: This area is Matrix land. The stand meets RMP guidelines for Overstory Removal (OR). The culmination of mean annual increment has been reached. The overstory trees are also showing increased mortality and decreased vigor. There is conifer regeneration of good quality and desired species composition. This regeneration, once released, would display increased vigor and canopy development.

Desired Future Conditions/Results: The short term condition of the action would be stand with multiple canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 7-10 trees per acre remaining. The mid-story would contain pole sized tree, spaced more consistently throughout the unit. The understory would consist of mainly residual natural regeneration with additional conifers established in a few areas after harvest through planting. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this stand is Overstory Removal/Commercial Thin (OR/CT). Mark to retain 7-10 large conifers (20”+ DBH) across the diameter classes. Remove fading and dying trees from the stand, favor leaving healthier trees. Commercial thin areas of smaller diameter trees to 100 ft^2 of basal area. Pre-commercial thin conifer regeneration to a 14’x14’ spacing. Favor Douglas fir and pines/cedar for leave in the pre-commercial thin treatment. Slash brush and canyon live oak. Interplant areas of unit that do not meet stocking standards with a Douglas fir and minor species mix. Pile all slash and burn piles, avoid piling slash next to natural regeneration areas.

Alternative Options Considered: Another option for this unit was to group select (GS) approximately 2 acres of the stand to remove the unhealthiest trees. This would result in a stand with fewer trees retained in the overstory then the 6-8 trees per acre the RMP describes.

Unit 23-2 and Unit 14-2W T. 32S R.6W Sections 23 and 14

<u>Stand Description</u>: This unit consists of mature Douglas fir, ponderosa pine, sugar pine and incense cedar ranging in diameters from 10"-44"DBH. Much of the unit is a drier, south facing pine site that has significant Douglas fir encroachment under a mature pine overstory. The northeastern portion of the unit is a moister site of predominately Douglas fir with scattered white-fir. The stand also contains a few large 50"+ older remnant Douglas fir trees scattered throughout the unit. Canopy closure is 60%-70% and live crown ratios are on average 30%; some areas are around 20%. There is evidence of a past fire throughout the entire unit as fire scars and cat faces in many of the larger trees is evident. There has been a significant decrease in incremental growth in the past 50 years. Some of the Douglas fir and ponderosa pine is fading or is dead, especially on the southern aspects. Areas in the stand are showing pockets of conk and breakout, an indicator of stand decline. The understory on the southerly aspect contains Pacific madrone, California black oak, tanoak, and conifer regeneration. The easterly aspect is moister, containing big leaf maple, chinquapin, dogwood, tanoak, and hazel. Ground cover consists of dwarf Oregon grape, tanoak, vanilla leaf, whipplevine, and some grasses on the easterly aspect and bear grass, tanoak, conifer regeneration, and poison oak on the southerly aspect.

<u>Analysis</u>: This area is designated Matrix land. The stand meets RMP guidelines for Regeneration Harvest (RH). Annual incremental growth has slowed significantly, and the stand is in a state of decline. The understory is capable of developing and increasing growth rates through a release treatment.

<u>Desired Future Conditions/Results</u>: The short term condition of the action would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, sugar pine and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The mid-story would contain smaller diameter trees and would be spaced more consistently across the unit. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. Retained trees would display increased growth rates and vigor and develop fuller, deeper crowns. The stand would retain this multi-story structure for the long term.

<u>Avoidance Strategies:</u> none

<u>Recommended Treatment</u>: The recommended treatment for this unit is a Regeneration Harvest/Pine Restoration (RH/Pine Rest.). There would be areas of Commercial Thin (CT) in the unit as well. Mark to retain 7-10 large conifers per acre (20"+ DBH) across the diameter classes. Favor ponderosa pine, sugar pine, and incense cedar on southerly aspects for leave. Mark leave trees accordingly to prevent damage of large black oak found in the unit. Mark for leave the large older remnant Douglas fir and incense cedar as legacy trees and to provide structure in the stand. Thin portions of unit where smaller diameter timber exists to approximately 80 ft^2 basal area, favoring pine/cedar for leave where possible. On the easterly aspect, RH stand to 7-10 trees per acre and CT areas to 100 ft^2 of basal area. Slash tanoak and Pacific madrone (1"-7" DBH), girdle larger trees up to 12"DBH to release quality conifer regeneration. The brushfield above the road is to be brushed to create plantable areas. Pre-commercial thin areas of conifer regeneration to 14'x14' spacing, favoring pine/cedar on southerly aspect and Douglas fir on easterly aspect for leave. Plant the brush field above the road with Douglas fir/pine/cedar mix. Assess the unit post-harvest for other planting and fuel treatment needs.

Unit 9-18 T.32S R.5W Section 9

Stand Description: This unit consists of a two-storied second growth stand of mainly Douglas fir with some scattered white-fir and incense cedar. Diameters generally range from 6”-30” DBH. Basal area ranges from 200-300 ft^2. Live crown ratios are about 40% and canopy closure is approximately70%-80%. The understory consists of conifer regeneration, hazel, alder, Pacific madrone, vine maple and big-leaf maple. The ground cover consists of dwarf Oregon grape, ferns, salal, vine maple, some blackberry and whipplevine. The middle portion of unit contains smaller pole sized (6”-11” DBH) trees, as well as some thick patches of conifer regeneration. The unit becomes a drier site as you move towards the south end.

Analysis: This land is designated Matrix land. This unit does not currently meet the RMP guidelines for Regeneration Harvest. This stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain two storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: Retain 120 ft^2 of basal area (approximately 50%-60% canopy closure) in the pole sized timber to prevent wind-throw or snow damage.

Recommended Treatment: The recommended treatment for this stand is Commercial Thin (CT). Thin the stand to retain 100 ft^2 of basal area, favoring the largest and healthiest trees for leave. Remove suppressed and poorly formed trees as well as trees with low live crown ratios (<20%). Favor Douglas fir over white-fir in this stand, removing single or small groups of white-fir where possible. Retain the larger Douglas fir and incense cedar that are scattered across the unit. In the pole sized timber areas, retain a canopy closure of 60% or approximately 120 ft^2 of basal area to provide wind and snow firmness until trees put on more diameter and crown growth. Pre-commercial thin areas in stand to a 14’x14’ spacing, space these trees off retained commercial sized trees. Natural seeding would be used to fill in some small openings.

Unit 33-2B T. 32S R. 5W Section 33

Stand Description: This unit straddles an east-west orientated ridge. The unit consists of Douglas fir, sugar pine, ponderosa pine and incense cedar. The diameters generally range from 10”-40” DBH. The live crown ratios are generally around 30%. Sugar pine and ponderosa pine are the dominate trees in this stand. Douglas fir has encroached in on most of the pines resulting in increased competition and slowing of annual growth. The understory consists of Douglas fir regeneration, tanoak, Pacific madrone and chinquapin. Ground cover consists of tanoak, conifer regeneration, rattlesnake plantain, poison oak, and bear grass in spots.

Analysis: This area is designated as Matrix land. This land is allocated as a Connectivity Block. This unit meets the requirements of the RMP for Regeneration Harvest (RH). The proposed treatment would reduce competition on the pines and cedars.
The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large ponderosa pine, sugar pine and incense cedar. The overstory would be open with approximately 12-18 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Regeneration Harvest/Pine Restoration (RH/Pine Rest.). Mark to retain 12-18 large conifers per acre (20”+ DBH) across the diameter classes, favoring for leave pines and cedars. Especially favor for leave sugar pines where they are present. Tanoak and additional hardwoods 1”-7” DBH are to be slashed and piled to release conifer regeneration. Assessment of the unit for planting needs would be done post-harvest. Additional fuels treatments may include piling of activity slash and burning as well as underburning.

Unit 33-2A T. 32S R. 5W Section 33

Stand Description: This unit consists of mature Douglas fir 24”-60” DBH with scattered white-fir and incense cedar. Much of the stand has been harvested in the past with evidence of a partial cut. The western portion of the unit contains tanoak, chinquapin, and thick conifer regeneration in the understory. The eastern portion of the unit contains a heavy component of tanoak and Pacific madrone in the understory. There are scattered western hemlock present in the western portion of the unit. Various areas throughout the unit are showing signs of decline. Broken tops and fading trees are beginning to appear in the stand. There are areas of conk found in the eastern portion of the unit as well. Ground cover consists of vine maple, ferns, salal and conifer regeneration in the western portion to tanoak, whipplevine, and a few ferns in the eastern portion of the unit.

Analysis: This land is designated Matrix land. This land is allocated as a Connectivity Block. This stand meets the RMP requirements for Regeneration Harvest. The overstory trees are displaying increased mortality and decreased vigor. A new, faster and more vigorously growing stand would replace what is currently in the unit.

Desired Future Conditions/Results: The short term condition of the action would be a stand with multiple canopy layers. The overstory would be dominated by mainly large Douglas fir and incense cedar. The overstory would be open with approximately 12-18 trees per acre remaining. The mid-story would contain smaller diameter trees spaced more consistently and displaying increased vigor and fuller, deeper crowns developing. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: Timely site preparation, and periodic site maintenance to be completed post-harvest to prevent tanoak from becoming a major component in the stand.

Recommended Treatment: The recommended treatment for this unit is Overstory Removal/Commercial Thin (OR/CT) for the western portion and Regeneration Harvest (RH) for the eastern portion. Mark for leave 12-18 large conifers (20”+ DBH) per acre across the diameter classes. The commercial thin portion would be along the boundary of Unit 33-2B. Removal of suppressed and poorly formed trees is desired. Thin other areas containing smaller diameter trees to retain approximately 100 ft^2 of basal area, favoring Douglas fir and incense cedar for leave. Pre-commercial thin conifer regeneration in the unit to a 14’x14’ spacing. Favor Douglas fir and incense cedar for leave and space regeneration off of the drip lines of leave trees. Upper portion of the west piece and most of the east piece are to brushed/slashed/piled. Slash and pile all tanoak and Pacific madrone, 1”-7” DBH, in these areas. Assess the unit post-harvest for additional fuels treatment needs as well as planting needs.

Unit 31-3 T. 32S R. 5W Section 31

Stand Description: This unit consists of mature Douglas fir and incense cedar ranging in diameter from 20”-44” DBH. There are some smaller Douglas fir, incense cedar and white-fir (8”-12” DBH) found scattered throughout the unit. Canopy closure throughout the unit is approximately 60%. Live crown ratios are approximately 30%-40%, with some of the smaller suppressed trees less then 30%. The understory consists of limited conifer regeneration, tanoak, Pacific madrone, big-leaf maple, dogwood, and hazel. Groundcover consists of tanoak, hazel, vanilla-leaf, ferns, and dwarf Oregon grape.

Analysis: This land is designated Matrix land. The stand currently meets the RMP requirements for Regeneration Harvest. This unit is located within a Visual Resource Management (VRM) Class II designation area, but was determined not to visually impact the I-5 corridor. Annual growth has begun to slow in much of the stand. The overstory trees are displaying increased mortality and decreased vigor. A new, faster and more vigorously growing stand would replace what is currently in the unit.

Desired Future Conditions/Results: The short term condition of the action would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees spaced more consistently. These retained trees would display increased vigor and develop fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: Timely site preparation, and periodic site maintenance to be completed post-harvest to prevent tanoak from becoming a major component in the stand.

Recommended Treatment: The recommended treatment for this unit is Regeneration Harvest (RH). Mark for leave 7-10 large conifers (20”+DBH) per acre across the diameter classes. Favor Douglas fir and incense cedar for leave trees. Commercial thin areas of smaller timber to approximately 100 ft^2 of basal area. Remove suppressed and poorly formed trees. Slash all tanoak (1”-7” DBH) in the understory and space any remaining conifer regeneration to a 14’ x 14’ spacing. Favor Douglas fir for leave while spacing non commercial sized conifers. Assess the unit post-harvest for fuels treatment and any planting needs.

Unit 25-1 T. 32S R. 6W Section 25

Stand Description: This unit consists of mature Douglas fir, incense cedar and ponderosa pine ranging in size from 16”-44” DBH. There are occasional large 50”+ Douglas fir scattered through the unit. There is also a younger stand of Douglas fir and white-fir 10”-18” in diameter found on the flat in the southeastern portion of the unit. Canopy closure is approximately 75% and live crown ratios are 30%, less on some trees. The understory consists of conifer regeneration, incense cedar, Pacific madrone, hazel, big-leaf maple, and very little tanoak. There are areas of large California black oaks and Oregon white oaks found throughout the stand. Groundcover consists of conifer regeneration, poison oak, rose, and some grasses.

Analysis: This land is designated as Matrix land. This unit is in the Visual Resource Management II (VRM) area boundary. This unit meets the RMP guidelines for Regeneration Harvest. Conk in found extensively in areas and culmination of annual increment has occurred in much of the stand. The overstory trees are displaying increased mortality and decreased vigor. A new, faster and more vigorously growing stand would replace what is currently in the unit.

Desired Future Conditions/Results: In the short term, the stand would show little sign of harvest activities. The overstory would be comprised of ponderosa pine, incense cedar and Douglas fir. The overstory would be more open and would contain 12-18 conifers per acre. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would have a definite two storied structure.

In the long term, the stand would eventually be reentered once visual requirements were met. The overstory would be open and contain 7-10 large conifers per acre. Ponderosa pine and incense cedar would be the dominate species prevalent in the stand. Smaller diameter trees retained during the first entry would have increased in diameter and would display increased vigor and would have developed fuller, deeper crowns.

Avoidance Strategies: Space leave trees evenly across the unit to prevent openings in the unit.

Recommended Treatment: The recommended treatment for this unit is Shelterwood Retention/Commercial Thin (SR/CT). Mark for leave 12-18 large conifers (20”+DBH) per acre across the diameter classes. Favor large pines and cedars for leave. The desired outcome for the majority of this stand is a pine restoration. In areas of very little or no pine, space Douglas fir accordingly. Mark for leave the occasional large 50”+ Douglas fir found in the unit as legacy and structure trees. In the Commercial Thin (CT) portion of the unit, thin to retain approximately 80-100 ft^2 of basal area. Pre-commercial thin conifer regeneration to a 14’x14’ spacing, favoring for leave pine and cedar in the areas of pine restoration. Assess the unit post-harvest for fuels treatment and planting needs.

Unit 24-5 T. 32S R. 6W Section 24

Stand Description: This unit consists of a two storied stand of ponderosa pine, sugar pine and incense cedar in the southern portion of the unit and a relatively single storied stand of Douglas fir with occasion pine in the northern portion of the unit. Diameters generally range from 8”-28” DBH with some dominate ponderosa pine and Douglas fir reaching 36”-40” in diameter. Canopy closure is approximately 70% and live crown ratios are 30%-40% throughout most of the stand. Basal area in the stand is approximately 240-400 ft^2. The understory consists of conifer regeneration, Pacific madrone, hazel, California black oak, Oregon white oak, and a small component of tanoak. Groundcover consists of grasses, poison oak, and occasional ferns.

Analysis: This land is designated Matrix land. It does not currently meet the RMP requirements for Regeneration Harvest. This stand has the ability to respond to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 30%-40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain two storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). The southern portion of the unit would focus on the retention of large pines. Thin pines and cedars to retain 80 ft^2 of basal area. Remove all suppressed trees where found in the unit. The northern portion of the unit would be a thin to retain approximately 100 ft^2 of basal area. Favor the largest and best trees as retention trees. The northwestern corner of the unit contains large ponderosa pine and incense cedar. Space trees in this areas to approximately 50’ x 50’. Pre-commercial thin conifer regeneration to 14’x14’ spacing favoring pine and cedar in the southern portion and favoring Douglas fir in the remaining portion of the unit. Assess the unit post harvest for fuels treatment needs as well as any planting needs that may be present.

Unit 8-1 T. 32S R. 5W Section 8

Stand Description: This unit consists of a second growth stand of 10”-36” DBH Douglas fir, incense cedar and white-fir. Larger incense cedar and Douglas fir 30”-50” DBH are found scattered throughout the unit as well. Basal areas range from 140-300 ft^2. Canopy closure is approximately 75% and live crown ratios are 30%-40%. The southern slope of unit contains some suppressed and dead trees. The understory consists of Pacific madrone, hazel, conifer regeneration, and areas of canyon live oak. Groundcover consists of occasional dwarf Oregon grape and ferns on the westerly slope and some grasses and occasion ferns. Many of the hardwoods have been shaded out of the stand and are dead.

Analysis: This land is designated as Matrix. This unit does not currently meet the RMP requirements for Regeneration Harvest. This stand has the capability to respond to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). Thin to retain approximately 100 ft^2 of basal area throughout the stand. Thin from below removing the suppressed and poorly formed trees where they are found. Favor the large residual incense cedar and Douglas fir for leave. Slash brush and hardwood species (1”-7” DBH), space conifer regeneration to a 14’ x 14’ spacing. Assess the unit post harvest for fuels treatment needs. These treatments may include piling of brush and slash and burning of the piles.

Units 15-8, 10-1W and 10-2W T. 32S R. 6W Sections 15,10

Stand Description: These units consist of mature stands of large Douglas fir, incense cedar, ponderosa pine and sugar pine. Diameters generally range from 24"-50" DBH with occasional scattered 60+" Douglas fir and incense cedar. Live crown ratios are approximately 30% and canopy closure is 60%-70%. There are some areas in the stand that are showing signs of decline, spike-top, broken tops and snags are present. There are a few areas of smaller diameter timber, mainly Douglas fir and occasional white-fir that ranges in size from 10"-20" DBH. The understory consists of quality conifer regeneration, Pacific madrone, chinquapin, tanoak, oceanspray, and hazel. Portions of the unit, especially in Section 10, have large areas of Pacific madrone in the overstory. Ground cover consists of tanoak, canyon live oak, whipplevine, piper's Oregon grape, rose, and some ferns and vanilla leaf. Bear grass is present along the main ridge of the unit.

Analysis: This unit is designated Matrix land**.** This stand meets the RMP requirements for Overstory Removal (OR). Annual incremental growth has slowed significantly, and the stand is showing increased mortality and decreased vigor. The smaller diameter trees and conifer regeneration present is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees as well as release an understory of vigorously growing conifers.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, sugar pine and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees spaced more consistently. These retained trees would display increased vigor and develop fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for these units is an Overstory Removal/Commercial thin (OR/CT). Retain 7-10 conifers an acre across the range of diameters greater then 20" DBH. Favor leaving ponderosa pine, incense cedar and sugar pine where they are found. Commercial thin areas of smaller diameter trees to retain 100 ft^2 of basal area, favoring the larger, healthier trees for leave. Thin around the large pines near the ridge in Section 10 up to 25' off the edge of the drip line. Pre-commercial thin the areas of conifer regeneration to a 14'x14' spacing, slash white-fir regeneration where it is found. Save sugar pine seedlings where they are found. Pile activity slash and burn piles. Assess the units post-harvest for planting needs. Plant area with a mix of Douglas fir and minor species. Favor planting pine and cedar species on main ridge.

Unit 15-2 T. 32S R. 6W Section 15

Stand Description: This unit consists of two very distinct stand types. The first is a stand of 24"-40" DBH ponderosa pine, sugar pine and a few incense cedar. There are a few mature large Douglas fir scattered throughout as well. The understory consists of a dense stand of 4”-16” DBH Douglas fir. There are a few California black oaks present in this stand, of which most are being overtopped or are dead. Groundcover consists of bear grass and hairy honeysuckle. The second stand type is one of large Douglas fir and incense cedar 20”-40” DBH. Portions of the unit are showing signs of decline in the form of snags, fading trees and broken tops. The understory consists of tanoak, canyon live oak, hazel and oceanspray. There is very little conifer regeneration in the understory. Ground cover is varied depending on aspect, but contains dwarf Oregon grape, vanilla leaf, poison oak and ferns.

Analysis: This unit is designated as Matrix land. This stand meets the RMP requirements for a Regeneration Harvest. Many parts of this stand contain pines in a state of decline from competition and Douglas fir encroachment. Old snags, broken tops and fading trees are all present. A significant slowing in growth occurred in the pines approximately 50 years ago.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, sugar pine and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees spaced more consistently. These retained trees would display increased vigor and develop fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatments for this unit is Regeneration Harvest/Pine Restoration/Commercial Thin (RH/Pine Rest/CT). Mark for leave 7-10 large conifer per acre across the diameter class (20”+ DBH). In the pine restoration area, favor large healthy ponderosa pine and sugar pines for leave. Mark for leave the occasional mature Douglas fir in the pine sites. In the remainder of the unit, mark for leave Douglas fir and incense cedar across the diameter range (20”+ BDH). Favor the larger healthier trees for leave where possible. Mark for leave the occasional ponderosa pine and sugar pine where they are found. In the areas of smaller diameter trees, commercial thin the stand to retain approximately 80-100 ft^2 of basal area. Favor leaving pine and cedar in these commercial thin areas. Assess the unit post-harvest for planting and fuels treatment needs. These treatment may include: cutting of hardwood and brush species (1”-7” DBH), piling of activity slash and burning of piles.

Unit 11-2W T. 32S R.6W Section 11

Stand Description: This unit straddles a north to south oriented ridge and is broken up into a west aspect and an east aspect. The west aspect consists of 24”-50” DBH Douglas fir. Live crown ratios are approximately 20%-30%, with some less then 20%. Canopy closure is approximately 50%. The understory consists of western hemlock, tanoak, Pacific madrone and conifer regeneration. Ground cover consists of dwarf Oregon grape, tanoak and oceanspray. The east aspect consists of a second growth stand of 6”-20” DBH Douglas fir. Canopy closure is 80% and the live crown ratios are approximately 30%. There are many suppressed and fork topped/crooked trees in this stand. Snow damage is evident in many areas. The understory contains only a small percentage of hardwoods, as stem exclusion has occurred in this stand. The ground cover consists of a few ferns and dwarf Oregon grape.

Analysis: This unit is designated as Matrix land. The west portion of this unit meets the RMP requirements for regeneration harvest, while the east portion does not. The western aspect is displaying signs of increased mortality and decreased vigor. Many conks are present in the overstory trees and the culmination of annual increment has occurred in many of the trees. The eastern aspect is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: The short term condition of the treatment for the west portion would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir. There would be a one acre group selection area to remove a pocket of mortality. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term. Short term future conditions for the east portion of the unit would open the canopy of the stand to approximately 50% canopy cover. Reduction of competition on the retained trees would result in increased growth rates.

Long term conditions would be increased vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: Retain approximately 50% canopy closure on the eastern aspect of this unit to prevent areas of snow damage and blowdown.

Recommended Treatment: The recommended treatment for this unit is: for the western portion is a Group Selection (GS) and for the eastern portion, a Commercial Thin (CT) is proposed. Locate a one acre group selection area along the western boundary to encompass a pocket of mortality in a stand of mature timber. Remove fading and dying trees; salvage some of the dead timber as well. Remove all the western hemlock that is found in the stand. For the east portion of the unit, mark to retain a basal area of 100-120 ft^2. Remove suppressed and poorly formed trees. Mark to retain trees that are not displaying any snow damage where possible. Pre-commercial thin quality conifer regeneration to a 14’ x 14’ spacing, favoring Douglas fir for leave. Slash all tanoak and hemlock regeneration 1”-7”

DBH. Assess the unit post-harvest for planting fuels treatment needs. Plant the group selection area with a Douglas fir and minor species mix to meet stocking standards.

Unit 11-3W T. 32S R. 6W Section 11

Stand Description: The unit consists of 20”-50” DBH Douglas fir and incense cedar with occasional sugar pine present. Portions of the unit contain stands of 12”-24” DBH Douglas fir, some of which are suppressed or dying out. There are areas towards unit 11-2W that are showing signs of snow damage, mainly in smaller diameter trees. Towards the southern end of the unit along the ridge, there are a few 40”-70” DBH incense cedar and sugar pines. Canopy closure is approximately 70% throughout the unit. Live crown ratios are on average about 30%. The understory is very variable depending on aspect in this unit. In general, southern and southwestern aspects contain a large component of canyon live oak and tanoak. The easterly aspect contains an understory of incense cedar, tanoak, oceanspray and hazel. Pacific madrone is present on most aspects. There are areas of dense conifer regeneration especially on ridge. Ground cover consists of some ferns, tanoak and hazel on the easterly aspect and on the southern and westerly aspects, there is poison oak, bear grass, canyon live oak, rose and whipplevine.

Analysis: This unit is designated as Matrix land. This stand does meet the requirements of the RMP for Regeneration Harvest. The majority of this stand is displaying vigorously growing trees, with little signs of mortality. Incremental growth rates in this stand are not showing signs of slowing at the present time. This stand can respond to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions of the treatment would open the canopy of the stand to approximately 40%-50% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Conifer regeneration would be spaced more consistently and have access to more light, water and nutrients.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: Retain approximately 50% canopy closure in the northern portion of this unit to prevent areas of snow damage and blowdown.

Recommended Treatment: The recommended treatment for this unit is Commercial thin (CT). Mark to retain a basal area of 100 ft^2 on the eastern aspects and 80-100 ft^2 on the southerly and southwestern aspects. Large sugar pine, ponderosa pine and incense cedar are desired for leave. Care is to be given in areas where snow damage is evident as not to open the canopy too much. Mark to retain approximately120 ft^2 of basal area in these snow damaged areas. Space quality conifer regeneration to 14’x14’ spacing. Slash tanoak and canyon live oak 1”-7” DBH. Pile brush and activity slash and burn piles.

Alternative Options Considered: A regeneration harvest was considered for this unit. The stand meets the RMP guidelines for a regeneration harvest, but because of stand vigor and consistent incremental growth, a commercial thin prescription was chosen.

Unit 21-8 T. 32S R. 6W Section 21

Stand Description: The unit consists of large Douglas fir, ponderosa pine, sugar pine and incense cedar generally 30”-60” DBH for the dominate trees. Mixtures of co-dominate and intermediate trees ranging in size from 12”-24” DBH are also present in this unit. White-fir is also present in portions of the stand. There are some sparsely stocked areas in the stand as well as areas dominated by a heavy hardwood component. Canopy closure is approximately 60%. The unit is bisected by a north to south running riparian area; the west portion of the unit is drier with an understory of canyon live oak, tanoak and Pacific madrone. The ground cover consists of rose, whipplevine and piper’s Oregon grape. The eastern portion of the unit is a bit moister with an understory of tanoak, chinquapin, hazel, and Pacific madrone (some 16”+DBH). Ground cover consists of hazel, tanoak and a few areas of bear grass.

Analysis: This land is designated as Matrix land but this section is allocated as a Connectivity Block. This stand does meet the RMP requirements for a Regeneration Harvest. Overstory trees are displaying increased mortality and decreased vigor. The mid-story trees are capable of responding to a release treatment. The treatment proposed would release this mid-story component and reduce competition on these trees. The retained trees would display increased vigor and crown development.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, incense cedar and sugar pine. The overstory would be open with approximately 12-18 trees per acre remaining. The mid-story would consist of smaller diameter trees spaced more consistently. These retained trees would display increased vigor and develop fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this stand is a Regeneration Harvest (RH). Mark to retain 12-18 large conifers per acre (20”+ DBH). Retained conifers should represent species composition found naturally in the stand as well as be representative of the range of diameter classes present. Favor retaining large sugar pines where they are found in the unit. In the areas smaller diameter trees, mark to retain a basal area of 80-100 ft^2. Remove suppressed and poorly shaped trees in these areas. Retain the occasional white-fir and western hemlock for species diversity . Pre-commercial thin areas of quality conifer regeneration on a variable spaced grid from 14’ –20’ apart. Hand pile activity slash and burn unit after harvest activities. Assess the unit post-harvest for additional fuels treatments and planting needs.

<u>Alternative Options Considered</u>: Dividing this unit into 3-4 separate units and harvesting each of these units at separate times so one large stand was not harvested at one time was also considered.

Unit 33-2C T. 32S R. 5W Section 33

Stand Description: A large southeast to northwest orientated ridge is present running through about half of the unit. The north half of the unit consists of small diameter Douglas fir, ponderosa pine, sugar pine and incense cedar. Diameters generally range from 6”-20” DBH, there are a few large 36”+ residual Douglas fir in the stand as well. Basal area is approximately 200-240 ft^2. Portions of the unit in the northwestern corner contain white-fir. The understory consists of Pacific madrone, canyon live oak and tanoak. There is almost no conifer regeneration present in much of the stand. Ground cover consists of poison oak, piper’s Oregon grape, rose, tanoak and old manzanita bones. The southern half of the unit consists of a mature stand (24”-44” DBH) of mainly Douglas fir and ponderosa pine mixed with a stand of smaller diameter timber (8”-24” DBH). Live crown ratios in this area are approximately 20% or less on some trees. The understory in this area contains Pacific madrone, canyon live oak, tanoak and areas of manzanita. Ground cover consists of poison oak, tanoak and hairy honeysuckle.

Analysis: This land is designated as Matrix land. This land is allocated as a Connectivity Block. The southern half of the unit meets the RMP requirements for Regeneration Harvest (RH). The northern portion of the unit does not meet the requirements. The majority of the mature trees in the southern portion of the unit are displaying increased mortality and decreased vigor. Many fading, broken-top trees and snags are present in this area, especially above the rock quarry. Establishing a stand of healthy and vigorous growing trees is what is desired in this stand.

Desired Future Conditions/Results: The stand condition of the treatment proposed would be in two part: in the short term, the treatment for the northern half of the unit would open the canopy of the stand to approximately 30%-40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Areas containing larger conifer regeneration would be released from under the larger hardwoods. The northern portion of the unit would display fewer areas of mortality.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. The treatment would also promote new regeneration in areas where none had previously been.
The southern portion of the stand would contain areas of 1-2 acre openings where salvage took place. On a stand level, vigor would be increased and mortality would be decreased.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for the unit is a Commercial Thin (CT) for majority of the unit. The recommended treatment for the southern half of the unit is Commercial Thin (CT) with areas of salvage harvest. Locate a group selection (GS) in the portion of the unit between the two roads and another above the quarry (northwestern corner). Create a group selection of up to 2 acres (166.5’ radius) to promote pine restoration on the area between the two roads. Remove all encroaching white-fir and

Douglas fir from this area. Space out pines and cedars to approximately 80 ft^2 of basal area and remove suppressed trees where needed. Occasional Douglas fir can be left if not near any pine or interfering with regeneration. In the north half of the unit, mark to retain a basal area of approximately 80 ft^2, favoring ponderosa pine, sugar pine and incense cedar as leave trees. Retain the occasional large mature residual Douglas fir in the stand. In the group selection above the quarry, favor leaving healthy trees; remove most of the dead or dying trees in the stand. Favor leaving pines in this area because of aspect and droughty soils. In areas where larger conifer regeneration is present (>20' tall), girdle Pacific madrone up to 12" DBH to release the conifers. Space conifer regeneration to a 14'x14' spacing. Favor pine/cedar regeneration for leave in the majority of the unit. Assess the unit post-harvest for planting and fuel treatment needs. Plant the group selection area above the quarry with dry site species. Fuels treatments may include piling of brush and activity slash and burning of the piles as well as follow-up underburning treatments.

Unit 21-15A and 21-15B T.32S R. 6W Section 21

Stand Description: Unit 21-15B consists of large ponderosa pine, Douglas fir, sugar pine and incense cedar. Diameters generally range from 24"-44" DBH with occasional trees 55"+ DBH. Unit 21-15A contains a stand of smaller diameter Douglas fir ranging in size from 10"-20" DBH. Basal area in this unit is approximately 200-240 ft^2. Many suppressed and poorly formed trees are present in this stand. Canopy closure in this unit is 80%, for unit 21-15B it is approximately 60%-70%. Live crown ratios are approximately 30%. The understory of both units consists of Pacific madrone, heavy areas of tanoak, canyon live oak and chinquapin. Very little conifer regeneration is present in the stand. Ground cover consists of tanoak, some grasses and poison oak.

Analysis: This land is designated Matrix land, but this section is allocated as a Connectivity Block (CB). Unit 21-15B meets the RMP requirements for Regeneration Harvest (RH), while unit 21-15A does not. Increased mortality and decreased stand vigor is being displayed on many of the overstory trees. Annual incremental growth has slowed.

Desired Future Conditions/Results: The short term future conditions of the Regeneration treatment would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, sugar pine and incense cedar. The overstory would be open with approximately 12-18 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting.

Short term future conditions for the commercial thin portion of the unit would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. A multiple layered canopy would be present for the long term in this stand.

Avoidance Strategies: Mark to retain trees around the rock outcroppings and cliff areas.

Recommended Treatment: The recommended treatment for unit 21-15B is Regeneration Harvest(RH). Mark for leave 12-18 large conifers (20"+ DBH) per acre across the diameter classes. Favor large ponderosa pine, sugar pine and incense cedar for leave in this area. Unit 21-15A is to be marked as a commercial thin with a desired basal area of approximately 100 ft^2 retained. Remove suppressed and poorly formed trees. Favor leaving larger, healthier trees where possible. Assess the unit post-harvest for fuels treatment and planting needs. Fuels treatment may include slashing of brush and hardwood species from 1"-7" DBH. Piling of brush and activity slash and burning of piles would also be included in this treatment.

Unit 15-9 and 15-9A T. 32S R. 6W Sections 15, 22

Stand Description: These units consist of a two-storied stand of scattered large Douglas fir, sugar pine and incense cedar (24”-44” DBH). Live crown ratios are 50% on the dominant trees in many parts of the stand. Much of the stand has an understory of small diameter Douglas fir 8”-18” DBH mixed with a heavy component of Pacific madrone and chinquapin. Basal area in the stand is approximately 200-240 ft^2. Tanoak is present in portions of the unit. Many different aspects are present in this unit, and the ground cover consists of a mixture of moist and dry site plant communities. Drier sites (ridges and southerly aspects) contain bear grass, rose, some conifer regeneration and areas of poison oak. The moister site (draws) contains salal, dwarf Oregon grape and ferns. Unit 15-9A is located in the Transient Snow Zone (TSZ) and would be treated to retain 30% canopy closure across the unit.

Analysis: This stand is designated as Matrix land. These units meet the RMP requirements for Regeneration Harvest (RH). Both units are displaying decreased vigor and increased mortality in the overstory component. The understory trees are capable of responding to a release treatment. The proposed treatment would reduce stand density and increase vigor and growth on retained trees.

Desired Future Conditions/Results: The short term future conditions of the treatment would be a stand with approximately a 40% canopy closure in much of the unit. Increased vigor and growth would occur on the smaller diameter trees. Fuller, deeper crowns would develop due to better spacing. Areas that contain clumps of larger trees would be spaced to obtain an open canopy with 7-10 large conifers (20”+ DBH) per acre retained. These areas would have a stand of two very distinct canopy layers; the overstory would be dominated by large Douglas fir, incense cedar, and sugar pine while the understory would contain a new stand of conifers established after harvest if necessary. Unit 15-9A would have areas of no commercial treatment as well as 1 acre group selections that would produce a two storied stand in places. There would also be a smaller hardwood component in the stand.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for unit 15-9 is Regeneration Harvest/Commercial Thin (RH/CT). In the smaller diameter trees, commercial thin retaining approximately 100 ft^2 of basal area. Favor the large sugar pine for leave where they are found. In areas where clumps of large mature trees are found, thin these to approximately 70’ x 70’ spacing. Favor the healthier trees as leave trees. Unit 15-9A is to receive 4-6 one acre group selections to mitigate the open space percentage in the TSZ. These group selections are to be placed in areas that have a concentration of large, mature trees that are showing signs of decline. Locate at least one group selection around some large sugar pine in the northwestern portion of the unit. In these group selections, mark everything for cut except the few dominant sugar pines in the middle of the selection. The remainder of Unit 15-9A from commercial harvest at this time, but would potentially receive silviculture and fuels treatments if necessary, Extensive site prep would be necessary for these units. Slash all brush and hardwood species 1”-7” DBH and pile. Pile all activity slash as well and burn piles. Girdle chinquapin up to 12” DBH to release quality conifer regeneration in the understory. Assess the units post-harvest for additional fuels treatments as well as planting needs.

Unit 21-7 T. 32S R. 6W Section 21

Stand Description: This unit consists of 14”-24” Douglas fir and ponderosa pine. Much of the stand contains suppressed and poorly formed trees. Live crown ratios are approximately 30%. Some larger trees along the ridge in the northwest portion of the unit are showing signs of decline (snags, fading tops, etc.). The understory consists of canyon live oak, Pacific madrone, tanoak and chinquapin. There is almost no natural conifer regeneration present in the unit. Ground cover consists of rose, poison oak, bear grass and canyon live oak.

Analysis: This unit is designated as Matrix land, but this section is designated as a Connectivity Block (CB). This stand does not currently meet the RMP requirements for Regeneration Harvest (RH). This stand is capable of responding to a release treatment. Stand density would be reduced and the retained trees would display increased vigor and development of fuller, deeper crowns.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Pine would come back into the unit where it has been dropping out. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2, favoring the larger healthier trees for leave. Removal of suppressed and poorly formed trees is desired throughout the stand. Open up 25’ off of the drip line of ponderosa pine near the ridge. Open up around healthy pine only, if a pine appears to be fading or has a low live crown ratio (< 30%), remove pine and space the remaining trees. Slash and pile brush and hardwood species 1”-7” DBH and burn piles. Assess the unit post-harvest for additional fuels and silviculture treatments.

Unit 5-1 T. 32S R. 5W Section 5

Stand Description: This unit consists of large mature Douglas fir, incense cedar with scattered sugar pine and ponderosa pine. Diameters generally range from 24"-50" DBH. Portions of this unit have been thinned during a partial cut in 1969. There is quality conifer regeneration in openings and in areas in and around the partial cut. The understory consists of Pacific madrone, some conifer regeneration, canyon live oak, and some manzanita in the northern portion of the unit. Groundcover consists of beargrass and poison oak in the northern end of the unit to ferns, dwarf Oregon grape, oceanspray and Prince's pine for the remainder of the unit.

Analysis: This unit is designated as Matrix land. This stand currently meets the RMP requirements for Regeneration Harvest. This stand is showing signs of decline, with snags and fading trees present. Annual growth is very slow in the overstory trees. Increased mortality and decreased vigor is evident throughout. Establishing a vigorous and healthy stand of young trees would be the goal of the treatment.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this stand is a Regeneration Harvest (RH). Retain 7-10 large conifers (20"+ DBH) per acre across the diameter classes. Retain sugar pine and ponderosa pine along the northern portion of the unit. For the remainder of the unit, retain larger, healthier trees evenly spaced across the unit. In the southern end of the unit, slash hardwoods for site prep before planting. Slash canyon live oak up to 7" DBH and pile. Unit is to be planted after harvest with a mixture of Douglas fir and minor species to meet stocking level standards. Favor planting pine/cedar species in the northern portion of the unit. Pile all brush and activity slash and burn piles.

Unit 5-26 T. 32S R. 5W Section 5

Stand Description: This unit consists of large, mature Douglas fir and some scattered white-fir. Diameters range from 30”-60” DBH with a few 70”+ trees present. Live crown ratios are approximately 40%. Canopy closure is approximately 60%-70%. The understory is poorly stocked with a few big-leaf maple, Pacific yew, some Pacific madrone, chinquapin and some conifer regeneration. Groundcover consists of Prince’s pine, ferns, dwarf Oregon grape and rattlesnake plantain.

Analysis: This unit is designated as Matrix land. This stand currently meets the RMP requirements for Regeneration Harvest. The overstory trees are displaying increased mortality and decreased vigor. Snags and broken-top trees are evidence of this decline. The stand has reached the culmination of annual incremental growth. A new, healthy and vigorously growing stand would replace a stand in a state of decline.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term.

Avoidance Strategies: Mark to retain the large big-leaf maple (20”+ DBH) that are present in the stand.

Recommended Treatment: The recommended treatment for this stand is a Regeneration Harvest (RH). Mark to retain 7-10 large conifers (20+” DBH) per acre across the diameter classes. Favor for retention the largest of the trees (70”+) for legacy trees. The southern end of the unit is to be pre-commercial thinned. Space Douglas fir regeneration on 14’ x 14’ spacing. Assess the unit post-harvest for planting and fuel treatment needs. Fuels treatments may include cutting of brush and hardwood species 1”-7” DHB. Piling of activity slash and brush and burning the piles are also possible treatments post-harvest.

Unit 5-12 T. 32S R. 5W Section 5

<u>Stand Description</u>: This unit consists of mainly mature Douglas fir 24”-50” DBH. A few larger 60”+ DBH Douglas fir exist in the stand as well. Smaller incense cedar, white-fir and Douglas fir are scattered throughout the unit as well. The understory consists of Pacific madrone, chinquapin, canyon live oak, hazel, a few areas of alder, and some conifer regeneration. There are pockets of dense regeneration in a few areas of the unit, most prevalent along the road. Groundcover consists of dwarf Oregon grape, rattlesnake plantain, ferns, whipplevine and some sparse grass.

<u>Analysis</u>: This unit is designated as Matrix land. This stand does meet the RMP requirements for Regeneration Harvest. The overstory trees are experiencing a downward trend in incremental growth. Increased mortality and decreased vigor is evident throughout the stand. A new, healthy and vigorously growing stand would replace a stand in a state of decline.

<u>Desired Future Conditions/Results</u>: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees and would be spaced more consistently. Reduced competition on the retained trees would promote increased vigor and development of fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this multi-story structure for the long term.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Regeneration Harvest (RH). Retain 7-10 large conifers (20”+ DBH) per acre across the diameter classes. Favor healthy trees and some of the larger 60”+ trees for leave and legacy trees. Commercial thin the portions of smaller diameter trees to retain a canopy closure of 40% or a target basal area of approximately 100 ft^2. Remove suppressed and poorly formed trees as well. Areas of quality conifer regeneration are to be pre-commercial thinned to a 14’x14’ spacing. Assess the unit post-harvest for planting needs as well as any fuels treatments that may be needed.

Unit 5-15 T. 32S R. 5W Section 5

Stand Description: This unit consists of large mature Douglas fir with some scattered incense cedar and sugar pine. Diameters range from 24”-50” DBH. Fire scars are present on most of the large trees. The understory consists of Douglas fir and incense cedar regeneration of commercial size (8”-12” DBH), Pacific madrone, canyon live oak and some hazel. Groundcover consists of beargrass and rose on the ridge and whipplevine, dwarf Oregon grape, ferns and some mosses further down the slope. Rock outcroppings are present in a few areas.

Analysis: This unit is designated as Matrix land. This stand does meet the RMP requirements for Regeneration Harvest. Much of this stand is showing signs of decline through either dying trees or slowing incremental growth. Many snags are present in the stand. Much of the sugar pine found near the ridge is fading or is dead already. Establishing a new faster growing and more vigorous stand is the purpose of this treatment.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir and incense cedar with the occasional sugar pine. The overstory would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees and would be spaced more consistently. Reduced competition on the retained trees would promote increased vigor and development of fuller, deeper crowns. The understory would consist of residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: Mark for retention trees within 30’ of the rock outcroppings found in the unit.

Recommended Treatment: The recommended treatment for this unit is a Regeneration Harvest (RH). Retain 7-10 large conifers (20”+ DBH) per acre across the diameter classes. Mark for leave any healthy sugar pine and large incense cedar. Favor healthy trees for leave, also leave the occasional large 50”+ tree for legacy and structure trees. In the few areas of the unit where there pockets of smaller diameter trees exists, mark to retain a 40% canopy closure or a target basal area of approximately 100 ft^2. Retain trees around rock outcroppings. Slash and space hardwoods (1”-7” DBH) on 40’ x 40’ spacing selective slash conifer regeneration on 14’ x 14’ spacing. Pile all brush and activity slash and burn piles. Assess the unit post-harvest for planting needs. This unit is surrounded by a large fuels reduction unit (W-5-1).

Unit 5-14 T. 32S R. 5W Section 5

Stand Description: This unit consists of a multistoried stand of mature Douglas fir and sugar pine 30”-50”DBH in the overstory and some smaller Douglas fir and incense cedar in the understory. Live crown ratios in this unit are approximately 50%. Canopy closure is approximately 60%, with some areas 70%-80% closure. The understory consists of canyon live oak, Pacific madrone, conifer regeneration and areas of chinquapin. Groundcover consists of dwarf Oregon grape, poison oak, hazel, rose, whipplevine and some areas of manzanita.

Analysis: This unit is designated as Matrix land. This stand currently meets the RMP guidelines for Regeneration Harvest. The overstory trees are displaying increased mortality and decreased vigor. Annual incremental growth is beginning to slow. The smaller diameter trees are capable of responding to a release treatment. Stand density would be reduced and the retained trees would display increased vigor and development of fuller, deeper crowns.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees and would be spaced more consistently. Reduced competition on the retained trees would promote increased vigor and development of fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is a Regeneration Harvest (RH). Retain 7-10 large conifers (20”+ DBH) per acre across the diameter classes. Retain an extra 1-2 trees per acre in the areas of ravelly soil. Favor healthy trees for leave, especially retain large healthy sugar pines. In the portions of the unit where pockets of smaller diameter trees exists, mark to retain a 40% canopy closure or a target basal area of approximately 100 ft^2. Assess the unit post-harvest for fuels treatments and planting needs.

Units 20-1 and 29-1W T. 32S R. 6W Sections 20 and 29

<u>Stand Description</u>: This unit consists of Douglas fir 30”-50” DBH with scattered sugar pine, ponderosa pine and incense cedar. The overstory component is generally healthy, but incremental growth is slowing. Canopy closure is approximately 60%-80% depending on location. A small area of second growth Douglas fir and white-fir is in the northern portion of unit 29-1W. The stand consists of mainly small diameter 10”-24” DBH trees. The understory consists of some Douglas fir regeneration, Pacific madrone, tanoak, and some canyon live oak. Above the road has evidence of a past fire passing through the stand and there is a heavy brush component in theses areas. Portions of the unit contain a large tanoak component with some of the trees 6”-12” DBH. Ground cover consists of tanoak, dwarf Oregon grape and areas of canyon live oak.

<u>Analysis</u>: This land is designated as Matrix land. This stand does meet the RMP requirements for Regeneration Harvest. Annual incremental growth is slowing and is trending towards culmination. Establishment of a new young stand of vigorous growing trees is the purpose of this treatment.

<u>Desired Future Conditions/Results</u>: The short term condition of the treatment would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, incense cedar and sugar pine. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of natural regeneration with additional conifers established after harvest through planting if necessary. There would be much less competition from hardwoods and brush for conifer regeneration. The stand would retain this two story structure for the long term.

<u>Avoidance Strategies</u>: Timely site preparation and hardwood control is essential in this unit to allow the establishment of a new stand.

<u>Recommended Treatment</u>: The recommended treatment for this stand is Regeneration Harvest (RH). Retain 7-10 large conifers (20”+ DBH) per acre across the diameter classes. Retain a good mix of species, especially retain healthy sugar pine where possible. Brush species and tanoak (1”-7” DBH) would be main concern and are to be slashed and piled. In the area of smaller diameter trees in unit 29-1W, mark to retain 40% canopy closure or a target basal area of approximately 100 ft^2. Favor Douglas fir for retention in this stand. Assess the unit post harvest for planting and additional fuels treatment needs.

Unit 4-24 T.32S R.5W Section 4

Stand Description: This unit consists of Douglas fir and incense cedar ranging in diameter from 20”-50” DBH. There are a few large Douglas fir 70”+DBH in the unit, mainly on the east end near the property line. The stand contains a larger component of incense cedar towards the riparian area. Basal area ranges from 200-400 ft^2. Live crown ratios are approximately 40%-50%. Canopy closure is approximately 60%. The north end of unit is dominated by a thick stand of chinquapin, with very little conifer growth present. The understory consists of canyon live oak near the ridge, and is present in a few openings. Pacific madrone is present on the western portion of the unit. Very little understory is present in most of the stand. Ground cover consists of canyon live oak, hazel, very few ferns, very little conifer regeneration and scattered rose.

Analysis: This area is designated Matrix land. The stand meets RMP guidelines for Regeneration Harvest (RH). Portions of the unit is showing signs of decline, with broken and fading tops and conk present in some of the larger trees. Remnant pine is present in a few areas, most of which is dead. Increased mortality and declining vigor is evident throughout much of the stand. Establishment of a young more vigorously growing stand is the purpose of this treatment.

Desired Future Conditions/Results: The short term condition of the treatment would a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this two story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is a Regeneration Harvest (RH). Retain 7-10 large conifers (20”+ DBH) per acre across the diameter classes. Retain healthy pine where possible. There are a few small areas of Commercial Thin (CT) in this unit. In these areas, mark to retain a basal area of approximately 100 ft^2. Favor the larger healthier trees for leave. Remove suppressed and poorly formed trees from the stand. The north-eastern portion of the unit has a high hardwood component and it is recommended to slash hardwoods (1”-7” DBH) and space to 40’ x 40’. Release any conifer regeneration in the understory and space this regeneration to 14’ x 14’. Planting and additional fuels treatment needs would be assessed post-harvest.

Unit 5-2W T. 32S R. 6W Section 5

Stand Description: This unit consists of mainly mature Douglas fir 24”-65” in diameter. Some incense cedar is present towards the southern half of the unit. Canopy closure is approximately 70% with some areas even higher. Live crown ratios are on average 30%-40% in much of the stand. The understory contains patches of canyon live oak, chinquapin and some conifer regeneration in spots. The northern portion of the unit contains quality conifer regeneration, western hemlock and white-fir. Ground cover is dwarf Oregon grape, salal, Prince’s pine, ferns, vanilla leaf and some grasses. Good quality conifer regeneration is present in the northern portion of the unit. Rock outcroppings are present in the southern portion of the unit; these are indicated by patches of canyon live oak.

Analysis: This unit is designated as Matrix land, but is allocated as a Connectivity Block (CB). This stand currently meets the RMP requirements for Regeneration Harvest (RH). Areas of the stand are showing signs of decline in the form of broken and fading tops. Live crown ratios on trees in portions of the unit are less then 30%. Declining vigor is evident throughout much of the stand.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir with scattered incense cedar. The overstory would be open with approximately 12-18 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term.

Avoidance Strategies: Mark to retain trees within 30’ of rock outcroppings in the unit.

Recommended Treatment: The recommended treatment for this stand is a Regeneration Harvest (RH). Mark for leave 12-18 large conifers (20”+ DBH) per acre across the diameter classes. In areas with smaller diameter trees, mark to retain a basal area of approximately 100 ft^2 or a canopy closure of approximately 40%. The northern portion of the unit contains enough conifer regeneration to allow for Overstory Removal (OR). Pre-commercial thin quality conifer regeneration, favoring Douglas fir for leave, to a 14’x14’ spacing. Assess the unit post-harvest for fuels treatments and planting needs. If fuels treatments are needed, retain the hardwood component (canyon live oak) around the rock outcroppings.

Unit 15-1 T. 32S R. 6W Section 15

Stand Description: This unit consists of mainly large Douglas fir and incense cedar 38”-60”DBH. Towards the eastern portion of the unit, a smaller diameter stand of Douglas fir and white-fir 8”-20”DBH is present. Canopy closure throughout the unit is approximately 60%. There is evidence of an old fire that passed through the eastern portions of this stand approximately 100 years ago. Many of the large overstory trees survived this fire and are still remaining in the stand. The understory consists of Pacific madrone, chinquapin, tanoak, Douglas fir and white-fir regeneration. The ground cover consists of tanoak, oceanspray, some conifer regeneration and dwarf Oregon grape.

Analysis: This land is designated as Matrix land. This stand does meet the requirements of the RMP for a Regeneration Harvest. Annual incremental growth is slowing and portions of the stand are displaying decreased vigor and increased mortality. In the smaller diameter trees, competition would be decreased and growth rates and vigor would increase on the retained trees.

Desired Future Conditions/Results: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees and would be spaced more consistently. Reduced competition on the retained trees would promote increased vigor and development of fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is a Regeneration Harvest/Commercial Thin (RH/CT). Retain 7-10 large conifers per acre across the diameter classes (20”+). Favor leaving larger, healthier Douglas fir and incense cedar. Commercial thin areas of smaller timber to retain a basal area of approximately 100 ft^2. Remove suppressed and poorly formed trees retaining the larger and healthier trees. Slash all tanoak and white-fir seedlings. Slash brush and hardwood species (1”-7” DBH), especially the chinquapin along the western boundary of the unit. Pile brush and activity slash and burn piles. Assess the unit post-harvest for planting and additional fuels treatment needs.

Unit 15-3 T. 32S R.6W Section 15

Stand Description: The unit consists of generally small diameter Douglas fir and white-fir. Diameters range from 8”-20” DBH. There is some scattered remnant large Douglas fir in the overstory, but is generally not a major component. Canopy closure is approximately 80%, with some areas even greater. The understory consists of Pacific madrone, tanoak, some conifer regeneration and chinquapin. Ground cover consists of tanoak, dwarf Oregon grape and oceanspray.

Analysis: This land is designated as Matrix. This unit does not currently meet the RMP requirements for Regeneration Harvest. This stand is capable of responding to a release treatment. The proposed treatment would reduce stand densities and increase vigor and growth rates on the retained trees.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain two storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2. Favor retaining the largest and healthiest trees in the stand with a species preference being Douglas fir for retention. Remove scattered white-fir from the stand as well as suppressed and poorly formed trees. In areas that contain a larger percentage of white-fir, thin to retain approximately 100 ft^2 of basal area. Retain the larger remnant Douglas fir that are scattered through the stand. Pre-commercial thin areas of conifer regeneration to a 14’x14’ spacing, favoring Douglas fir for leave. Assess the unit post harvest for fuels treatment needs. These treatments may include cutting of brush and hardwood species and piling and burning of brush and slash.

Unit 10-1 T. 32S R. 5W Section 10

<u>Stand Description</u>: This unit was a previous High Five unit (#3). There are four ~2 acre group selections in the stand from the previous harvest activity. The northwest ¼ of the section is withdrawn from the timber base due to soils/hydrology concerns. The unit consists of large Douglas fir, ponderosa pine and incense cedar. There is some white-fir towards the riparian in the western portion of the unit. Diameters generally range from 20"-50" DBH. Canopy closure is approximately 40%-50%. Live crown ratios are approximately 30%. The understory consists of intermediate conifers and Pacific madrone, while areas along the ridge contain large California black oak, some of which are 32"+ DBH. Ground cover consists of hazel, ferns and some conifer regeneration on the moister sites while the drier sites contain rose, bear grass and poison oak.

<u>Analysis</u>: This unit is designated as Matrix land. This stand meets the RMP requirements for Regeneration Harvest. Many portions of the unit are experiencing declining trees and slowing of annual growth. Snags and broken-top trees are present through much of the stand. The mid-story component would be released and would increase growth rates and vigor. A young, new stand would be established that would display vigorous growth and decreased mortality.

<u>Desired Future Conditions/Results</u>: The short term condition of the treatment would be a stand with multiple canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, incense cedar and would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees and would be spaced more consistently. Reduced competition on the retained trees would promote increased vigor and development of fuller, deeper crowns. The understory would consist of natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

<u>Avoidance Strategies</u>: Avoid damaging the large California black oak during the harvesting and yarding operations. Open up the canopy around these large oaks to promote long-term retention in the stand.

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Regeneration harvest (RH). Mark to retain 7-10 large conifers per acre (20"+ DBH) across the range of diameter classes. Favor leaving the large ponderosa and sugar pines that are along the southeastern boundary of the unit (down the main ridge). Avoid marking trees for cut that in the falling and yarding operations would damage the large California black oaks that are found on this ridge. Mark for leave the large incense cedar that are found in some of the few small draws that are present in the unit. Site preparation and planting needs would be assessed post harvest and may include hand piling of activity slash and burning as well as brushing and pre-commercial thinning treatments.

Units 3-11 and 9-2 T. 32S R. 5W Sections 3,9

Stand Description: These units consist of primarily second growth stands of Douglas fir with some scattered white-fir and incense cedar. Most of the stand in section 3 is 10”-16” DBH, with a few trees up to 22”DBH. The stand in section 9 is smaller with diameters of 6”-12” DBH. Canopy closure throughout the stand is 80%-90%. Basal areas range from 160-240 ft^2. Stem exclusion has occurred throughout much of the stand, and the understory is nonexistent in many areas. There are a few areas of big-leaf maple, chinquapin and alder. The ground cover consists of dwarf Oregon grape, some ferns and rattlesnake plantain.

Analysis: These units are as designated Matrix land, but section 3 is allocated as a Connectivity Block (CB). Section 9 is Matrix land. These units do not meet the RMP requirements for Regeneration Harvest (RH). These stands are capable of responding to a release treatment. There are areas of blow down in the riparian and additional expansion is not desired.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy closure. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly and the stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: In areas adjacent to blowdown, leave a row of trees for leave then “feather” the mark from a basal area of 120 ft^2 to eventually achieve a basal area of 100 ft^2 after one tree length.

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2, favoring the larger and healthier trees for leave. Favor Douglas fir and incense cedar for leave. The north end of unit 3-11 would need brushing and slashing to promote regeneration in areas dominated by brush species. Site preparation and planting needs would be assessed post harvest and may include hand piling of activity slash and burning, as well as brushing and pre-commercial thinning treatments.

Unit 3-8 T. 32S R. 5W section 8

Stand Description: This unit contains a second growth stand of mainly small diameter Douglas fir, ponderosa pine and incense cedar. The average diameter for the stand is 12"DBH. There are a few pockets of larger residual trees left from the previous harvest with diameters ranging from 15"-24" DBH. Most of these larger trees are white-fir. This unit has received a pre-commercial thin in. Basal area in the stand ranges from 140-180 ft^2. Canopy closure is approximately 80%. Stem exclusion has taken place in this stand and the understory is nonexistent in many areas. Ground cover consists of dwarf Oregon grape, ferns, some blackberry, vine maple and some hazel.

Analysis: This unit is designated as Matrix land. This stand does not meet the RMP guidelines for regeneration harvest. This section is also allocated as a Connectivity Block (CB). This stand is capable of responding to a release treatment.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. The stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2. Strive to retain a good species composition, favor Douglas fir and incense cedar for leave, but retain the occasional healthy ponderosa pine where found. Site preparation and planting needs would be assessed post harvest and may include hand piling of activity slash and burning, as well as brushing and pre-commercial thinning treatments.

Unit 9-1 T. 32S R. 5W Section 9

Stand Description: This unit contains a young stand of small diameter Douglas fir and incense cedar. Diameters generally range from 12"-20" DBH. Portions of this stand were the result of a previous fire that was salvaged. Canopy closure is 80%, with many areas 90%-100%. Basal area in the stand is approximately 240-300 ft^2. The understory is very sparse with Pacific madrone in portions of the unit, but for the most part, stem exclusion has taken place in this stand and there is a very limited understory. Many riparian areas are present in this unit, with big leaf maple and alder present throughout. Pacific yew is also present in areas. Ground cover is dependant upon aspect, but consists of Piper's Oregon grape, dwarf Oregon grape, ferns and poison oak.

Analysis: This unit is designated as Matrix land. This stand does not currently meet the RMP requirements for Regeneration Harvest. This stand is capable of responding to a release treatment.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. The stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: Mark to retain trees around large Pacific yew as not to damage them while falling and to retain a higher canopy closure over this species.

Recommended Treatment: The recommended treatment for this unit is a Commercial Thin (CT). Retain a basal area of approximately 100 ft^2, favoring the larger and healthier trees as leave trees. Retain Douglas fir and incense cedar as the main species for this unit. Remove white fir where present. Mark to retain larger healthier trees that are displaying good crowns and have a live crown ratio of greater then 30%. Slashing and brushing of portions of the understory of this unit for fuels reduction is needed. These areas would be Assessed post-harvest to determine need and extent. Planting needs would also be assessed post-harvest.

Unit 9-17 T. 32S R. 5W Section 9

Stand Description: This unit contains a stand of mainly large Douglas fir 20”-44” DBH with some white-fir and ponderosa pine scattered through the unit. Canopy closure is approximately 50%-60% and the stand overall contains about 12-30 trees per acre. The portion of the unit above the road (northeastern portion) is a bit drier, and has more hardwoods then lower piece. The understory consists of good quality Douglas fir regeneration (2”-7” DBH), Pacific madrone, canyon live oak, some manzanita and areas of oceanspray. A few areas in the stand contain very dense canyon live oak patches. Ground cover consists of bear grass and hairy honeysuckle.

Analysis: This unit is designated as Matrix land. This stand does meet the RMP requirements for Overstory Removal (OR). The understory of this stand is capable of responding to a release treatment once overstory is removed.

Desired Future Conditions/Results: The short term condition of the treatment is a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and ponderosa pine. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this two story structure for the long term.

Avoidance Strategies: Mark trees in a manner to avoid damaging natural conifer regeneration during harvesting and yarding operations.

Recommended Treatment: The recommended treatment for this unit is Overstory Removal (OR). Retain 7-10 large conifers per acre across the diameter classes (20”+). Favor leaving healthy trees to provide long term structure for the stand. Retain healthy ponderosa pine where present. Remove white-fir from the stand where found. Pre-commercial thin understory after harvest to a 14’x14’ spacing. Slash areas of heavy canyon live oak and areas of thick brush. Interplant where needed to meet minimum stocking standards with appropriate stock. Pile all slash and burn piles making sure piles are not placed near good regeneration areas.

Unit 4-4 T. 32S R. 5W Section 4

<u>Stand Description</u>: This unit contains a mixed stand of large Douglas fir, sugar pine, ponderosa pine and incense cedar with areas of smaller diameter Douglas fir. Diameters generally range from 32”-50” DBH for the larger timber and 12”-20” DBH for the smaller stands. There are occasional 60”+ trees in this stand. The eastern end of the unit appears to have been thinned/salvaged at some point in time. This portion of the unit above the road has a basal area of approximately 200 ft^2. The understory consists of mainly Pacific madrone and canyon live oak with some scattered California black oak. The western end of the unit contains good conifer regeneration. The eastern end of the unit has manzanita present. Ground cover consists of hazel, poison oak, whipplevine and rattlesnake plantain. Soil becomes rockier above the road.

<u>Analysis</u>: This unit is designated as Matrix land. This stand meets the RMP requirements for Regeneration Harvest. Incremental growth in the stand is slowing and the stand is approaching the culmination of annual increment.

<u>Desired Future Conditions/Results</u>: The short term condition of the treatment is a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, and occasional sugar pine and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this two story structure for the long term.

<u>Avoidance Strategies</u>: Mark trees in a manner to avoid damaging natural regeneration that is found in the stand during the harvesting and yarding operation. Immediate site preparation is needed to avoid the expansion of brush areas.

<u>Recommended Treatment</u>: The recommended treatment for this unit is Regeneration Harvest/Commercial Thin (RH/CT). Retain 7-10 large conifers per acre across he diameter classes (20”+). Favor sugar pines, ponderosa pine and incense cedar for retention where possible. There is an area on the western portion of the unit that should be a pine restoration area. Favor pine/cedar in this area. Commercial thin areas of smaller diameter trees to retain approximately 80-100 ft^2 of basal area. Favor healthy and larger trees for leave. Openings in the stand that contain a brush component should be brushed and planted. Slash canyon live oak for planting. Portions of the stand need pre-commercial thinning of conifer regeneration to a 16’x16’ spacing. Slash Douglas fir regeneration from around the pine restoration area to 30’ off of drip line of retained trees. Pile all slash and burn piles. Care to be given about placement of piles near regeneration.

Unit 9-6 T. 32S R. 5W Section 9

<u>Stand Description</u>: This unit contains a multi-storied stand of mainly large Douglas fir 28”-50” DBH. There are some scattered large sugar pines and incense cedar as well as some ponderosa pine (near top end of unit). Canopy closure in the stand is approximately 60%. There are about 15-35 trees per acre. The understory consists of conifer regeneration with white-fir present in this layer ranging in size from 6”-12” DBH. Basal area in this layer is approximately 200 ft^2. The ground cover consists of rose, oceanspray, poison oak and Piper’s Oregon grape. Conifers occupy about 50% of the understory with hardwoods occupying the rest.

<u>Analysis</u>: This land is designated as Matrix land. This stand does meet the requirements for Regeneration Harvest.

<u>Desired Future Conditions/Results</u>: The short term condition of the treatment is a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, incense cedar and sugar pine. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of natural regeneration with additional conifers established after harvest through planting. This regeneration would also be spaced to promote more vigor and better growth. The stand would retain this same structure for the long term.

<u>Avoidance Strategies</u>: Mark trees in a manner to avoid damaging natural regeneration that is found in the stand during the harvesting and yarding operation.

<u>Recommended Treatment</u>: The recommended treatment for this stand is Overstory Removal/Commercial Thin (OR/CT). Retain 7-10 conifers per acre across the diameter classes (20”+). Favor leaving the occasional sugar pine and incense cedar found in the stand. The upper portion of the unit would be a pine restoration, favor ponderosa pine for retention. Remove all Douglas fir and white-fir, as well as hardwood and brush species, from around these pines up to 30’ off of drip line. Commercial thin smaller diameter trees to retain a basal area of approximately 80 ft^2. Favor pine and cedar for retention in this commercial thin portion. Remove white fir in this commercial thin area where possible while still meeting the basal area retention. Pre-commercial thin areas of conifer regeneration to an 18’ x 18’ spacing, favoring good pine and cedar seedlings for leave. Plant understocked portions of the unit with a 75% pine/cedar and 25% Douglas fir mix. Position on slope and private property boundary would warrant piling activity slash and burning piles. Care should be given not to pile slash around areas of good regeneration.

Unit 29-3W T. 32S R. 6W Section 29

<u>Stand Description</u>: This stand is a combination of OI 014 and 003 for section 29. This unit is similar to unit 29-1W, but is more of a southerly aspect and tends to be a bit drier. The overstory consists of large Douglas fir, ponderosa pine, incense cedar and sugar pine. Diameters range from 24”-50” DBH. There is some smaller timber in the southwestern portion of the unit ranging in size from 10”-24” DBH. Along the ridge there is a larger percentage of pine/cedar then in the rest of the unit. The understory consists of conifer regeneration (with white-fir), Pacific madrone, chinquapin and tanoak. There are a few large California black oak found at the south end of the ridgeline. Some areas have relatively large hardwoods 5”-18” DBH.

<u>Analysis</u>: This land is designated as Matrix land. This stand does meet the RMP requirements for Regeneration Harvest.

<u>Desired Future Conditions/Results</u>: The short term condition of the treatment is a stand with a multi-storied canopy. The overstory would be dominated by large Douglas fir, ponderosa pine, sugar pine and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this multi-storied structure for the long term.

Short term future conditions of the commercial thin areas would open the canopy of the stand to approximately 30%-40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. In the long term, the stand would show better growth and vigor on the retained trees. The canopy would close to near pre-harvest levels. Fewer trees would make up the stand, but the retained trees would be larger. Pine areas would be dominated by pine/cedar species as opposed to more of a Douglas fir dominated stand.

<u>Avoidance Strategies</u>: Mark trees in a manner to avoid damaging natural regeneration and California black oak during harvesting and falling operations. Immediate site preparation is to be done to avoid letting tanoak out compete conifer regeneration.

<u>Recommended Treatment</u>: The recommended treatment for this unit is Overstory Removal/Commercial Thin (OR/CT). Retain 7-10 larger conifers per acre across the diameter classes (20”+). Throughout the unit favor pines where they are found for leave. On the ridge, mark as if a pine restoration. Favor ponderosa and sugar pine for leave. Open up around pines in these areas, 30’ off of the drip line. Favor the healthiest and largest trees for leave in the CT areas. Commercial thin areas of smaller diameter trees to retain approximately 80-100 ft^2 of basal area. Favor retaining Douglas fir over white-fir in these areas. Slash all tanoak. Pile all slash and burn piles taking care not to pile slash near well formed/vigorous natural regeneration. Plant with appropriate stock for drier sites, favoring pine/cedar mix.

Units 23-5 and 23-3 T. 32S R. 6W Section 23

<u>Stand Description</u>: These units contain stands of second growth Douglas fir and some scattered white-fir 12”-28” in diameter. There are signs of old stumps with springboard notches in them as well as evidence of a fire approximately 70-80 years ago. Canopy closure is 70% throughout much of the stand. Basal area in the stand is 120-200 ft^2. The understory consists of Pacific madrone, canyon live oak, tanoak and some conifer regeneration. Ground cover consists of dwarf Oregon grape, grasses and some ferns.

<u>Analysis</u>: This land is designated as Matrix land. These stands do not currently meet the RMP requirements for Regeneration Harvest. Overall stand density is not that high, but hardwood component needs to be reduced to promote growth of desired conifer species. This stand has the ability to respond to a release treatment.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied. There would be fewer hardwoods remaining in the stand due to harvest operations.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. The treatment would promote a much lower hardwood component.

<u>Avoidance Strategies</u>: Site preparation and additional silviculture treatments are needed to avoid letting hardwoods out-compete retained conifers and new conifer regeneration.

<u>Recommended Treatment</u>: The recommended treatment for these units is Commercial Thin (CT). It is desired to retain a basal area of approximately 100 ft^2. Remove suppressed and poorly formed trees; favor leaving larger, healthier trees. Favor Douglas fir over white-fir in the stand. Care should be given in unit 23-5 when near the power lines as not to mark trees that in the act of falling could potentially fall into the right-of-way. Slashing of 1”-7” DBH hardwoods is desired for release of understory conifer regeneration. Falling/girdling of 7”+ DBH hardwoods with good quality conifer regeneration under them is also recommended. Slash tanoak and white-fir regeneration. Pile activity slash and burn piles.

Units 27-1 and 34-2 T. 32S R. 6W Sections 27 and 34

Stand Description: These two units where previously harvested under the High Five timber sale (Unit #6). The stand is generally comprised of large Douglas fir, ponderosa pine and incense cedar 20"-48" DBH. Canopy closure is approximately 50%-60%. The stand is displaying good leader growth in the understory conifers. Many portions of the unit have target stocking levels of conifer regeneration. The understory consists of Pacific madrone, California black oak, chinquapin, manzanita and conifer regeneration. Groundcover consists of grass, some manzanitia, and scattered poison oak.

Analysis: This land is designated as Matrix land. These stands meet the RMP requirements for Regeneration Harvest. An initial preparation cut has been performed on this stand and with this treatment; the final objective of these stands would be met.

Desired Future Conditions/Results: The short term condition of the treatment is a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine, incense cedar and sugar pine. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of natural regeneration with additional conifers established after harvest through planting. There would be much less competition from hardwoods and brush for conifer regeneration. The stand would retain this two story structure for the long term.

Avoidance Strategies: Mark trees in a manner to avoid damaging natural regeneration during harvesting and yarding operations. Do not create large openings that would be a visual concern for the Glendale-Azalea Road. Prevent creating openings greater then ¼ acre in these units because of visual concerns.

Recommended Treatment: The recommended treatment for this unit is Overstory Removal (OR). Retain 7-10 large conifers per acre across the diameter classes (20"+ DBH). It is desired to retain healthy sugar pine and ponderosa pine where found, especially on the southern aspects of the unit. Retain the occasional large Pacific madrones (1-3 per acre) that are also present in these units. Portions of these units need site preparation of slashing/brushing to create plantable areas. Much of these units would need a pre-commercial thin to space out conifer regeneration in the future, and this need would be assessed post-harvest. Units are to be planted with a mix of ponderosa pine, sugar pine and cedar on the southerly aspects and a Douglas fir/minor species mix throughout the remainder of the units.

Silviculture Options Considered: A harvest treatment that maintained a higher canopy closure was considered for these units, but was rejected because these units are not within the VRM II designation area.

Units 35-1 and 34-3 T. 32S R. 6W Sections 34,35

<u>Stand Description</u>: These units consist of generally small to medium sized Douglas fir and ponderosa pine 8”-24” DBH. There are a few large 40”+ residual Douglas fir and ponderosa pines scattered through the unit. Unit 35-1 tends to have smaller trees (8”-22”DBH) with fewer residual trees. Both of these units are very dense, with basal areas of 220-340 ft^2. Unit 34-3 is somewhat older (~100 years) and has a canopy closure of 70%-80%. The crowns in this stand tend to be small and crown ratios are <30%. The understory consists of Pacific madrone, some chinquapin and a few California black oaks.

<u>Analysis</u>: This land is designated as Matrix land. These stands do not meet the RMP requirements for Regeneration Harvest. These stands are capable of responding to a release treatment.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 50% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied.

Long term conditions would be better stand vigor and better canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

<u>Avoidance Strategies</u>: Avoid opening canopy of stand to less then 50% closure, as small crowns in this stand are susceptible to wind throw. Mark trees in a manner to avoid damage to large California black oak during harvest and yarding operations.

<u>Recommended Treatment</u>: The recommended treatment for these stands is Commercial Thin (CT). Retain a canopy closure of 50% to compensate for wind throw potential on trees with small, underdeveloped crowns. Mark trees to retain a basal area of approximately 110-120 ft^2. Retain the larger and healthier trees for leave, removing suppressed and poorly formed trees. Groups of larger trees, with better developed crowns, should be thinned to retain approximately 100 ft^2 of basal area. Activity slash should be piled and burned in these units.

Units 34-1 and 27-3 T. 32S R. 6W Sections 27,34

Stand Description: These units consist of small diameter Douglas fir and occasional ponderosa pine. Diameters range from 8”-20” DBH, with very few larger residual trees 40”+ DBH. Unit 34-1 contains mainly conifers in the overstory, unit 27-3 moves more into a hardwood dominated overstory in many areas. Many trees are either suppressed or are crowded in much of the unit. Basal areas are 240-340 ft^2 in portions of the unit, lower in areas of hardwoods. Understory species present in the stand are California black oak, Pacific madrone and some conifer regeneration.

Analysis: This land is designated as Matrix land. These stands do not currently meet the RMP guidelines for Regeneration Harvest. These stands are capable of responding to a release treatment.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. The treatment would promote a much lower hardwood component.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for these units is Commercial Thin (CT). Thin to retain a basal area of approximately 100 ft^2, favoring larger and healthier trees for leave. Remove suppressed and poorly formed trees. Thin around large, single residual trees 25’ off of the drip line where they are found. Slashing of 1”-7” DBH and girdling of 7”+ DBH hardwoods that have well developed and vigorous growing conifer regeneration under them is desired. Attention would have to be given to regeneration already of sufficient height as not to get crowded out by hardwood sprouting. Follow-up slashing treatments would be assessed in the future. Many areas would need planting if hardwoods are removed. Plant areas of the unit to meet stocking standards with a Douglas fir and minor species mix. Favor planting minor species on the southerly facing aspects and main ridge to the southern end of the unit.

Alternative Options Considered: This area would be candidate for hardwood removal area. Gross yarding of madrone or use of girdling and slashing is possible where there is an understory of suppressed conifers.

Unit 27-6 T. 32S R. 6W Section 27

Stand Description: This unit contains a stand very similar to unit 27-3. Stand is mainly smaller diameter 8”-20” DBH Douglas fir with a hardwood component of Pacific madrone. This stand contains more conifers then in 27-3, but stand density overall is not high. The northern end of the unit has the highest stocking with a basal area of approximately 240 ft^2. Large madrone (10”-18” DBH) is present throughout the unit.

Analysis: This land is designated as Matrix land. This stand does not currently meet the RMP guidelines for Regeneration Harvest. This stand is capable of responding to a release treatment.

Desired Future Conditions/Results: Short term future conditions would be a stand with approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. The treatment would also promote a much lower hardwood component in the overstory.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this stand is Commercial Thin (CT). Thin to retain a basal area of approximately 100 ft^2, favoring larger and healthier trees for leave. Remove suppressed and poorly formed trees. Thin around large residual trees 25’ off of the drip line where they are found. Slashing of 1” – 7” DBH and girdling of 7”+ DBH hardwoods that have good conifer regeneration under them is desired. Attention would have to be given to regeneration that already of sufficient height as not to get crowded out by hardwood sprouting. Follow-up slashing treatments would be assessed in the future. Many areas would need planting if hardwoods are removed. Plant areas of the unit to meet stocking standards with a Douglas fir and minor species mix.

Unit 3-1W T. 32S R. 6W Section 3

Stand Description: This unit contains a stand of large Douglas fir and some incense cedar 28”-50” DBH. There is occasional sugar pine in the unit as well, but much of it is either fading or is already dead. Smaller diameter western hemlock and white-fir are found in the understory. Canopy closure is approximately 70%, with some areas containing more closure. The understory consists of conifer regeneration (approximately 10’-20’ tall in many areas), chinquapin and some tanoak. Groundcover consists of a heavy salal component in areas (up to 3’ high), oceanspray, dwarf Oregon grape, ferns, and some bear grass on the ridge top.

Analysis: This land is designated as Matrix land. This section is allocated as a Connectivity Block (CB). This stand meets the RMP requirements for Overstory Removal (OR).

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir with scattered sugar pine. The overstory would be open with approximately 12-18 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this two story structure for the long term.

Avoidance Strategies: Avoid damaging natural regeneration during harvesting and yarding operations.

Recommended Treatment: The recommended treatment for this stand is Overstory Removal (OR). Retain 12-18 conifers per acre across the diameter classes (20”+). Strive for species variation as well in this stand. Favor leaving large healthy sugar pine where they are present in the stand. Slash tanoak for site preparation. Many areas would need pre-commercial thinning or conifer spacing after harvest. Conifers should be spaced to 14’ x 14’. Some areas would need planting after harvest to meet stocking levels. Most of the planting would be concentrated below the road on the small sub-ridges that are present. Pile all slash and burn piles taking care not to pile slash near natural regeneration areas.

Unit 3-4W T. 32S R. 6W Section 3

<u>Stand Description</u>: This unit contains a stand of second growth Douglas fir, white-fir, incense cedar and very few ponderosa pines. There is also a few large Douglas fir (30"+ DBH) in the overstory remaining from a prior harvest. Generally the diameters are 6"-12" DBH. Basal area in the unit is approximately 200 ft^2. Canopy closure in this unit is 90%+ in much of the stand and stem exclusion has taken place in most of the unit. Density of the stand is highest in the northern portion. The southern portion of the unit is sparse and trees are somewhat smaller. The understory contains Pacific madrone, tanoak and chinquapin. The ground cover contains a large moss component, salal, ferns, dwarf Oregon grape, and a small percentage of bear grass near the ridge top.

<u>Analysis</u>: This land is designated as Matrix land. This section is allocated as a Connectivity Block. This stand does not currently meet the RMP guidelines for Regeneration Harvest. This stand is capable of responding to a release treatment.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this stand is Commercial Thin (CT). Majority of the thin area is small diameter timber (8"DBH). Thin to retain a basal area of approximately 100 ft^2, favoring larger and healthier trees for leave (dominate and co-dominate). Thinning from below is desired; removing suppressed and poorly formed trees. Pre-commercial thin conifers that are not of commercial size to a 14' x 14' spacing. Brushing/slashing of non-commercial species in the southern portion of the unit is recommended. Evaluate stocking levels after brushing in this portion and plant if stand does not meet stocking requirements.

Unit 5-7S T. 33S R. 5W Section 5

<u>Stand Description</u>: This unit contains a stand of mature Douglas fir, incense cedar and white-fir 28"-48" DBH. These overstory trees are very scattered with about 12-20 trees per acre present. Area has evidence of a previous partial cut. The understory is very dense in areas with Pacific madrone, tanoak and conifer regeneration (4"-12"DBH). Tanoak is a major component in this stand. Previous harvest resulted in an extremely dense understory of tanoak in areas. Groundcover consists of salal, dwarf Oregon grape and sword ferns.

<u>Analysis</u>: This land is designated as Matrix. This stand currently meets the RMP requirements for Regeneration Harvest.

<u>Desired Future Conditions/Results</u>: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The hardwood/brush component would be reduced to a lower level through site preparation. The stand would retain this two story structure for the long term.

<u>Avoidance Strategies</u>: Avoid tanoak from further impeding conifer growth in the understory layer of the stand. Set tanoak back through treatment and prevent it from reaching current levels again. Avoid damaging regeneration during harvesting and yarding operations.

<u>Recommended Treatment</u>: The recommended treatment for this stand is Overstory Removal (OR). Retain 7-10 large conifers per acre (20"+ DBH), favoring the larger healthier trees for leave. Retain Douglas fir and incense cedar as the main species in the stand. Release conifer regeneration from tanoak and brush competition through 100% slashing/brushing of hardwood and brush species up to 7" DBH. Space desired conifers to a 14' x 14' spacing. Some areas would need planting to meet stocking standards. Plant this unit with a Douglas fir and minor species mix. Pile all slash and burn piles taking care not to pile slash near regeneration.

Unit 5-21S T. 33S R. 5W Section 5

<u>Stand Description</u>: This unit contains a stand of very scattered 14"-26" DBH Douglas fir, white-fir and western hemlock. There are few Douglas fir up to 48"DBH in the stand as well. The overstory contains 5-10 trees per acre currently, so it is at minimum stocking for RH. Canopy closure is approximately 70%. Unit is on a northern aspect with a moist site. Presently the stand is healthy and growing well.

<u>Analysis</u>: This unit is designated as Matrix land. This stand currently does meet the RMP requirements for Regeneration Harvest, but the overstory component is has been reduced to a level that wouldn't make a regeneration harvest economically feasible. Overall, this stand should not be considered for a regeneration treatment.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40%-50% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied.

Long term conditions would be better stand vigor and better canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. The treatment would also promote new regeneration in the understory of desired species.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Commercial Thin (CT). Mark to retain a basal area of 100-110 ft^2. The desired species to retain in this stand is Douglas fir. Retain the largest and healthiest trees, removing western hemlock and white-fir. Small group selections of up to ½ acre should be placed in this unit to remove pure pockets of white-fir or western hemlock. Locate no more then 5 of these in this unit. Site preparation would be slash/pile/burn, slashing western hemlock and white-fir regeneration and selectively spacing quality Douglas fir regeneration to 14' x 14' spacing. Post-treatment survey to determine the need of planting in small openings.

Unit 17-4 T. 32S R. 5W Section 17

<u>Stand Description</u>: This unit contains a mature stand of Douglas fir, incense cedar, ponderosa pine and some white-fir. Diameters range from 20”-50” DBH. Portions of the unit contain small diameter Douglas fir and white-fir 8”-14” DBH. Ponderosa pine and incense cedar dominate the ridge in the southern portion of the unit. Live crown ratios are approximately 30%-40%. Canopy closure is approximately 60%. The understory consists of Pacific madrone, hazel and conifer regeneration. Groundcover consists of grasses, hazel and some ferns.

<u>Analysis</u>: This unit is designated as Matrix land. This stand meets the RMP requirements for Regeneration Harvest. The annual increment of the stand is showing signs of slowing. This unit would have a visual impact on the Fortune Branch community and a higher green tree retention rate is recommended.

<u>Desired Future Conditions/Results</u>: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, ponderosa pine and incense cedar. The overstory would be open with approximately 12-18 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting. The stand would retain this two story structure for the long term. Pine sites would be returned to a more natural stocking level and species composition.

<u>Avoidance Strategies</u>: Avoid visual impact on the Fortune Branch community.

<u>Recommended Treatment</u>: The recommended treatment for this unit is Regeneration Harvest/Pine Restoration (RH/Pine Rest). Retain 12-18 large conifers per acre across the diameter classes (20”+ DBH). Mark for leave healthier trees, and retain pine and cedar on the ridge in the southern end of the unit (Pine Restoration). Commercial thin any areas of smaller trees to retain approximately 100 ft^2 of basal area. Remove white-fir and suppressed trees from the stand where found. Brushing and pre-commercial thinning would be needed in portions of the unit. Spacing of the pre-commercial sized material would be 18’ x 18’ in the southern end of the unit and 14’ x 14’ elsewhere. Slash all Douglas fir and white-fir regeneration from around pines and large cedars to 25’ off of the drip line. This treatment is desired for pine restoration area. Pile all activity slash and burn piles. Plant understocked areas with a mix of Douglas fir and minor species, favoring pine/cedar in the southern portion of the unit.

Unit 5-27 T. 32S R. 5W Section 5

<u>Stand Description</u>: This unit contains a stand of medium sized Douglas fir with some scattered small incense cedar. Diameters generally range from 10”-30” DBH. There is some scattered large Douglas fir in the stand. Basal area in the unit is approximately 200-260 ft^2. Live crown ratios are around 40% and canopy closure is 80%. There are many suppressed trees present in this stand. Portions of the stand are showing signs of either wind or snow damage. The understory consists of incense cedar, some scattered white-fir seedlings, Pacific madrone and canyon live oak. Groundcover consists of dwarf Oregon grape, ferns, some canyon live oak, and moss. The north end of the unit has a rock outcropping with ferns and moss.

<u>Analysis</u>: This land is designated as Matrix land. This stand does not currently meet the RMP guidelines for a Regeneration Harvest. This stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates and better crown development. The stand would remain mainly single-storied.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in the stand longer.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Commercial Thin (CT). Retain approximately 100 ft^2 of basal area, favoring larger and healthier trees for leave. Remove suppressed and poorly formed trees (snow/wind break). Remove white-fir from the stand where it is present. Leave trees around the rock outcropping. The small ridge that is running down the middle of the unit is somewhat rocky, retain extra trees on this ridge. The unit would be evaluated after harvest for fuels and silviculture treatments.

Unit 5-18 T. 32S R. 5W Section 5

Stand Description: This unit contains a stand of large Douglas fir and incense cedar 30”-55” DBH. A partial cut from the Lost Fortune timber sale (unit #4) is evident below the road. Areas of the stand are fading and dying with spike tops and recent snags present, especially along the western and northern boundaries. Live crown ratios are approximately 40% and canopy closure varies from 20% to 60%. The understory is generally Douglas fir and incense cedar regeneration approximately 20’ tall. Pacific madrone and canyon live oak are also present in the stand. Groundcover consists of poison oak, rose, both Piper’s Oregon grape and dwarf Oregon grape, canyon live oak, hazel, and some ferns. Plant associations for both moist and dry sites are present depending upon location and aspect in the unit.

Analysis: This unit is designated as Matrix land. This stand meets the RMP requirements for Overstory Removal. The stand is in a state of decline and annual growth has slowed in the majority of the trees.

Desired Future Conditions/Results: The short term condition of the action is a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar. The overstory would be open with approximately 7-10 trees per acre remaining. The understory would consist of residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term.

Avoidance Strategies: Mark to retain trees that in the harvesting and yarding process would otherwise damage natural regeneration.

Recommended Treatment: The recommended treatment for this unit is Overstory Removal (OR). Retain 7-10 conifers per acre across the diameter classes. Favor healthy trees and the occasional large 50”+DBH tree for leave. Pre-commercial thin the understory to a spacing of 14’x14’. Slash canyon live oak and brush species for planting after harvest. Plant a mixture of Douglas fir and minor species, favor planting drier site species across most of the unit. Pile all slash and burn piles, taking care not to pile slash near areas of good conifer regeneration.

Alternatives Considered: Harvesting portion of the unit above the road as well as below the road. Upon inspection, the site was determined to be very rocky and droughty and was not conducive to harvesting and planting. This portion above the road would be better suited as a fuels reduction unit to reduce hardwood densities. Portion above the road also to be considered for withdrawal from the timber base.

Units 3-5 and 3-5A T. 32S R. 5W Section 3

Stand Description: These two units contain stands of mature large Douglas fir with scattered western hemlock, incense cedar and white-fir. Scattered large sugar pine is also present in the unit, some of which has died out. Diameters generally range from 30"-60" DBH, with few very large trees present in the stand (85"+ DBH). Canopy closure for much of the stand is 80%+. The understory mainly consists of Douglas fir and white-fir 10"-28" DBH. White-fir has filled in many of the canopy gaps. Conifer regeneration is well stocked through much of the stand, with some areas exceeding 500 trees per acre. There is also Pacific madrone, chinquapin, big-leaf maple, oceanspray, a small amount of Pacific yew, and vine maple present. Groundcover consists of sword fern, salal, dwarf Oregon grape and conifer regeneration.

Analysis: This land is designated as Matrix, but is allocated as a Connectivity Block. These units currently meet the RMP guidelines for Overstory Removal. The overstory trees are reaching the culmination of annual increment. The mid-story and understory trees are capable of responding to a release treatment.

Desired Future Conditions/Results: The short term condition of the action is a stand with three distinct canopy layers. The overstory would be dominated by large Douglas fir, incense cedar and occasional white-fir and would be open with approximately 12-18 trees per acre remaining. The mid-story would consist of medium sized Douglas fir, incense cedar and white-fir. The understory would consist of residual natural regeneration with additional conifers established after harvest through planting if needed. Smaller commercial sized trees would be spaced to allow for better crown development and better tree vigor. The stand would retain this three story structure for the long term.

Avoidance Strategies: Avoid damaging regeneration during harvesting and yarding operations.

Recommended Treatment: The recommended treatment for this unit would be Overstory Removal with areas of Commercial thin in the understory (OR/CT). Mark to retain 12-18 large conifers per acre across the diameter classes (20"DBH+). Mark to retain occasional large 60"+ trees for legacy and structure trees. Commercial thin the mid-story to retain a basal area of approximately 100 ft^2. Favor Douglas fir for leave as the main species in the commercial thin portions of the unit, but leave a representative percentage of white-fir and western hemlock to provide for species diversity. A pre-commercial thin treatment would be needed in many portions of the unit. Space conifer regeneration to 14' x 14' spacing, favoring Douglas fir, incense cedar and pine species for leave. Retain a representative percentage of white-fir and western hemlock in the understory as was prescribed in the overstory. Assess post harvest needs for fuels treatments as well as any planting needs. If fuels treatment is needed, pile all slash and burn piles.

Unit 3-10 T. 32S R. 5W Section 3

<u>Stand Description</u>: This unit contains a stand of small diameter mixed conifers. Species are mainly Douglas fir and white-fir with diameters of 4”-16” DBH. Canopy closure is 90%-100% in many areas. This stand is very densely stocked with both commercial and non-commercial sized trees. Mortality is evident in some trees due to competition and shading. A hardwood component of Pacific madrone, chinquapin, big-leaf maple and alder are present throughout the unit. Groundcover consists of ferns, dwarf Oregon grape and salal.

<u>Analysis</u>: This unit is designated as Matrix land, but is allocated as a Connectivity Block. This stand does not currently meet the RMP requirements for Regeneration harvest. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration in the understory would begin to slow. The stand would remain mainly single storied.

Long term conditions would be better stand vigor and better canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this unit is a Commercial Thin (CT) to reduce stand density. Mark to retain a basal area of approximately 100 ft^2, favoring the larger healthier trees for leave. Remove suppressed and poorly formed trees. Pre-commercial thin conifer regeneration, favoring Douglas fir for retention to a 14’x14’ spacing. Slash hardwoods for spacing and density reduction. Evaluate needs for fuels treatment after harvest. Handpile slash and burn piles to meet fuels objectives if needed.

Unit 3-19 T. 32S R. 5W Section 3

<u>Stand Description</u>: This unit contains a stand of large mature Douglas fir 24”-48” DBH. This stand had received an initial preparatory cut for a shelterwood harvest in 1985. Canopy closure is approximately 90%. The overstory component consists of approximately 10-15 trees per acre. The understory consists of conifer regeneration 4”-12” DBH, Pacific madrone, canyon live oak, chinquapin, hazel and oceanspray. Groundcover consists of swordferns, conifer regeneration, dwarf Oregon-grape and salal.

<u>Analysis</u>: This unit is designated as Matrix land, but is allocated as a Connectivity Block. This stand currently meets the RMP requirements for Regeneration Harvest. The overstory trees are showing signs of decline and the understory and mid-story layers are capable of developing and increasing growth rates through a release treatment.

<u>Desired Future Conditions/Results</u>: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 12-18 trees per acre remaining. The understory would consist of natural regeneration that would be spaced to promote fuller, deeper crown development and more vigorous growth. The stand would retain this two story structure for the long term. The areas of commercial thin would be spaced more consistently and the stand would demonstrate better stand vigor and growth.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this unit is Overstory Removal/Commercial Thin (OR/CT). Retain 12-18 conifers per acre across the diameter classes. Commercial thin portions of the understory to retain approximately 100 ft^2 of basal area. Leave a representative percentage of white-fir in the stand to provide for species diversity. Pre-commercial thin residual regeneration after harvest to a 16’x16’ spacing, pile all slash and burn piles. Make sure piles are not placed next to regeneration areas.

Unit 9-19 T. 32 S R. 5W Section 9

Stand Description: This unit contains a two-storied stand of large mature Douglas fir and incense cedar 30”-48” DBH in the overstory with an understory of 8”-22” DBH Douglas fir and white-fir. The overstory is scattered through much of the unit, but the southern end of the stand is well stocked. Canopy closure is approximately 80%. The understory also has Pacific madrone, chinquapin, oceanspray, vine maple and hazel. Ground cover consists of dwarf Oregon grape, conifer regeneration and some salal.

Analysis: This unit is designated as Matrix land. This stand does meet the RMP requirements for Regeneration Harvest. Release of the understory through overstory removal would provide more light for the smaller diameter trees to develop fuller crowns and more vigorous growth.

Desired Future Conditions/Results: The short term condition of the action would be a stand with three distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar and would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of medium sized trees that would be spaced more consistently and the stand would demonstrate better stand vigor and growth. The understory would consist of residual conifer regeneration, with additional conifers established through planting post-harvest if necessary. The stand would retain this three story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Overstory Removal/Commercial Thin (OR/CT). Retain 7-10 conifers per across the diameter classes (20”+). Retain larger healthier trees; retain some large incense cedar as well. In areas of smaller diameter timber and in the understory, commercial thin the stand to retain a basal area of approximately 100 ft^2. Remove suppressed and poorly formed trees as well as white-fir from the stand. Areas of dense conifer regeneration and hardwoods should be pre-commercial thinned and spaced. Spacing of conifers should be 14’x14’ and hardwoods to 40’x40’ spacing. Pile all slash and burn piles making sure not to pile slash near conifer regeneration.

Units 8-2 and 8-2A T. 32S R. 5W Sections 8,17

Stand Description: This unit is split by a prominent north-south orientated ridge. The majority of the unit is on the east aspect of this ridge. The northern unit (8-2) contains a stand of large mature Douglas fir and incense cedar 24"-50" DBH. Overstory canopy closure is approximately 60%. The understory consists of quality conifer regeneration, Pacific madrone, chinquapin, oceanspray and some tanoak and canyon live oak. The understory is suppressed in areas, but is showing good growth with an average diameter of 9" DBH. A few areas in the understory contain medium sized trees (up to 18" DBH). Trees in unit 8-2A is generally smaller in diameter 10"-20" DBH. Groundcover consists of ferns, bear grass and dwarf Oregon grape.

Analysis: This unit is designated as Matrix land. Portions of this stand currently meet the RMP requirements for a Regeneration Harvest. Older trees in a state of decline would be removed to release an understory of younger, more vigorously growing trees. Once released and spaced, this younger stand would develop fuller, deeper crowns and begin to show better growth.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar and would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term. The areas of commercial thin would be spaced more consistently and the stand would demonstrate better stand vigor and growth. This treatment would also promote better crown development on the retained trees.

Avoidance Strategies: Avoid damaging natural conifer regeneration during harvesting and yarding operations. Site preparation after harvest to prevent allowing tanoak to reestablish itself as a major stand component and out- compete conifer regeneration.

Recommended Treatment: The recommended treatment for this unit is Overstory Removal (OR) with some areas of Commercial Thin. Mark to retain 7-10 conifers per acre across the diameter classes (20"+). Commercial thin areas of the understory and the upper portion above the road to retain a basal area of approximately 100 ft^2. Remove suppressed and poorly formed trees. Favor Douglas fir and incense cedar for leave in the commercial thin areas. Slash all tanoak and areas of small diameter Pacific madrone in lower portion of the unit. Pile all slash and burn piles. Assess the need for planting post harvest, and if necessary plant unit with a Douglas fir and minor species mix.

Unit 17-7 T. 32S R. 5W Section 17

<u>Stand Description</u>: This unit contains a stand of large mature Douglas fir, incense cedar and ponderosa pine 28”-50” DBH. Canopy closure in the stand is up to 80% in areas. The understory in this stand is variable throughout. Portions contain dense patches of Douglas fir and incense cedar regeneration 4”-8” DBH; other portions contain commercial sized Douglas fir and white-fir 8”-18” DBH. In the southern end of the unit, the understory consists of ponderosa pine and canyon live oak. The stand is very variable depending upon aspect and position on the slope. Groundcover is variable as well, with dwarf Oregon grape, poison oak, canyon live oak, conifer regeneration, rose and whipplevine found in various locations.

<u>Analysis</u>: This unit is designated as Matrix land. This stand currently meets the RMP guidelines for Regeneration Harvest. Overstory trees are showing signs of increased mortality and decreased vigor. The understory and smaller trees are capable of responding to a release treatment. The treatment proposed would reduce stand density in the understory and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: The short term condition of the action is a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar and would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if needed. The stand would retain this two story structure for the long term. Pine sites would begin to trend more towards a pine dominated site rather then a Douglas fir dominated site as seen currently. Encroachment and competition from Douglas fir and white-fir would be set back. Areas of commercial thin would be spaced more consistently and the stand would demonstrate increased stand vigor and growth.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this unit is Overstory Removal/Commercial Thin (OR/CT). Retain 7-10 conifers per acre across the diameter classes (20”+). Mark for leave healthy trees, favor large incense cedar, and in the southern portion of the unit, ponderosa pine. Southern portion of the unit would be a pine restoration site. Favor leaving ponderosa pine and incense cedar in this area. Retain occasional large mature Douglas fir in the pine stand as well. Pre-commercial thin and brush portions of the unit. Pre-commercial thin to 14’x14’ spacing, favor Douglas fir, incense cedar and ponderosa pine for leave. Slash white-fir regeneration as well as hardwood species 1”-7” DBH. Slash Douglas fir regeneration from around retained pines and cedars up to 30’ off of the drip line. Pile all slash and burn piles taking care not to pile slash near regeneration. An assessment of the unit would be done post harvest to see need for planting.

Unit 31-1 T. 32S R. 5W Section 31

<u>Stand Description</u>: This unit encompasses a large portion of section 31. The stand is extremely varied with the majority of the stand being medium sized Douglas fir, white-fir and incense cedar 12”-30” DBH. There is a small portion of the unit (towards the center) that contains larger mature Douglas fir 20”-40” DBH. Basal areas range from 180-300 ft^2. Canopy closure in the unit ranges from approximately 60%-90%. Many areas contain dense stands of conifers with many suppressed trees and there are many areas that are showing signs of mortality due to competition. The southwestern portion of this unit has been identified by the US Forest Service Pacific Northwest Region Forest Health Protection survey as having a low frequency of Fir Engraver *Scolytus ventralis.* These insect areas show signs of Douglas fir and white-fir mortality through spike tops or fading tops. These areas are typically younger stands that are overstocked. The understory of the stand is varied dependant on aspect, but consists of canyon live oak, Pacific madrone, chinquapin and conifer regeneration in areas. Groundcover is aspect dependant as well but consists of canyon live oak, poison oak, dwarf Oregon grape, Piper’s Oregon grape, bear grass and whipplevine.

<u>Analysis</u>: This unit is designated as Matrix land. This stand does not meet the RMP guidelines for a regeneration harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40-50% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration in the understory would begin to slow. The stand would remain mainly single storied.

Long term conditions would be increased stand vigor and fuller, deeper crowns developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. In the long term, healthier more vigorously growing trees would be able to overcome any further insect infestations.

<u>Avoidance Strategies</u>: Reduce stand density through thinning treatment, as well as remove susceptible species, such as white-fir, where infestation is evident.

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Commercial Thin (CT). Mark to retain a basal area of approximately 100-120 ft^2, favoring larger healthier trees for leave. Favor Douglas fir and incense cedar for leave. Remove suppressed and poorly formed trees. Take special care in the southwestern portion of the unit to look for spike tops and dead tops of young Douglas fir and white-fir. Mark fading and trees that appear to have insect infestation for removal. Post harvest assessment for fuels and activity slash work. Pile all slash and burn where determined necessary.

Unit 17-1 T. 32S R. 5W Section 17

Stand Description: This unit contains a second growth stand of Douglas fir, ponderosa pine, white-fir, incense cedar and some occasional sugar pine. Diameters generally range from 10”-20” DBH. There are a few occasional larger residual trees remaining in the overstory. Canopy closure varies across the unit but is approximately 80%. The Fortune Branch Progeny Test site is also part of this unit. This site was planted in 1981-82 with genetically selected Douglas fir seedlings to test early growth. This site is approximately 12 acres in size and was planted on 9’ x 9’ spacing. These trees are 4”-7” DBH, with occasional 8”-10” DBH trees present. The center and eastern portions of this unit are identified by the US Forest Service Pacific Northwest Region Forest Health Protection survey as having a moderate frequency of Fir Engraver *Scolytus ventralis.* These areas show signs of Douglas fir and white-fir mortality through spike tops or fading tops. These areas are typically younger stands that are overstocked. The understory consists of Pacific madrone, chinquapin and big-leaf maple and in the riparian zone alder. Portions of the unit in the southern end are somewhat swampy. Off-site pine is also present in areas of the unit, mostly in the southern portion. Groundcover consists of dwarf Oregon grape, salal, grasses and very limited conifer regeneration. This unit is part of the Fortune-Stewardship project.

Analysis: This unit is designated as Matrix land. This stand does not meet the RMP requirements for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. The stand would remain mainly single storied. Off-site pine would be removed from the stand. Areas of insect infestation and the level of stand susceptibility to insects would be reduced through this treatment. Pre-commercial sized trees would be spaced to promote better crown development and vigor.

Long term conditions would be increased stand vigor and fuller, deeper crowns developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. In the long term, healthier more vigorously growing trees would be able to overcome any further insect infestations.

Avoidance Strategies: Avoid allowing insect infestation from expanding and becoming a major problem.

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2, favoring the larger, healthier trees for leave. Favor Douglas fir and incense cedar for leave in this unit. Special attention is to be paid in the portions of the unit that have insect damage. Trees with signs of decline (spike tops, peeling bark, flagging) should be marked for removal. Thinning around these outbreak centers is of top priority. Thin these areas to 80-100 ft^2 basal area. Locate a ~2 acre group selection area in the south-eastern portion of the unit. Locate this group selection to encompass an area of large sugar pine and incense cedar. The purpose of this selection is to remove Douglas fir from encroaching in a pine site as well as the spacing some of the pine and cedar. Remove all Douglas fir and white-fir from this area of the stand and mark to retain a basal area of approximately 80 ft^2. Favor sugar pine, ponderosa pine and incense cedar for retention in this group selection area. Pine should be removed from the riparian influence areas through single tree selection or by small group selection (up to ¼ acre in size). Two small areas of planted ponderosa pine in this unit are to receive a commercial thin, retaining any Douglas fir and white-fir and only well formed dominant ponderosa pine. Pine should be spaced no closer then 30' x 30' (approximately 40 ft^2 basal area). All other pine should be removed. The Fortune Branch Progeny Test site treatment is a pre-commercial/commercial thin to a spacing of 13' x 13' (on the diagonal). Prune the retained trees to ½ of the total tree height. In the off-site pine areas, retain Douglas fir and white-fir regeneration, space to 14' x 14'. Slash all pine regeneration in these areas. In the remainder of the unit, favor Douglas fir and incense cedar regeneration for retention. In the group selection area, favor ponderosa pine, incense cedar and sugar pine regeneration for leave. Space this regeneration to a 16' x 16' spacing. Pile slash and burn piles. Assess unit post-harvest for planting needs to meet stocking standards.

Unit 18-12 T. 32S R. 5W Section 8

Stand Description: This unit is part of OI number 18-02. This unit contains a stand of medium to large Douglas fir and incense cedar 12”-40” DBH. Occasional larger Douglas fir are scattered through the unit. There are approximately 10-20 large trees per acre. Overstory canopy closure is approximately 30%. Overall canopy closure is approximately 80%. The understory consists of Douglas fir and white-fir 4”-14” DBH, Pacific madrone, tanoak and canyon live oak. Ground cover consists of ferns, tanoak, bear grass on the ridge and dwarf Oregon grape.

Analysis: This unit is Matrix land. This stand currently meets the RMP guidelines for Overstory Removal. The overstory trees are displaying increased mortality and declining vigor. The release of an understory of established conifer regeneration and the planting of a new vigorously growing stand would establish a well stocked stand in the future.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two distinct canopy layers. The overstory would be dominated by large Douglas fir and incense cedar and would be open with approximately 7-10 trees per acre remaining. The understory would consist of residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term. The areas of commercial thin would be spaced more consistently and the stand would demonstrate increased stand vigor and growth.

Avoidance Strategies: Avoid allowing tanoak areas to expand or out-compete conifer regeneration.

Recommended Treatment: The recommended treatment for this unit is an Overstory Removal/Commercial Thin (OR/CT). Mark to retain 7-10 large conifers (20”+DBH) per acre, favoring the larger healthier trees for retention. Commercial thin the understory to retain a basal area of approximately 100 ft^2. Favor Douglas fir for retention in the understory. Remove white-fir and suppressed trees from the stand. Pre-commercial thin conifer regeneration to 14’ x 14’ spacing, slash white-fir regeneration when it is conflicting with Douglas fir regeneration. Slash all tanoak and smaller canyon live oak (<7”DBH). Pile all brush and slash and burn piles. Assess the unit after harvest and plant areas that do not meet stocking standards with a Douglas fir and minor species mix.

Unit 5-4 T. 32S. R. 5W Section 5

Stand Description: The unit consists of a second growth stand of 8”-18” DBH Douglas fir, incense cedar, white-fir and scattered ponderosa pine. Basal areas generally range from 80-180 ft^2. Unit has very variable densities, with the western portion of the unit having low basal areas. Many of the ponderosa pine are either fading or are dead in much of the unit. Canopy closure is varied from 40% in the western portion to 90% in the eastern portion. A small portion of the unit (approx. 2 acres) contains a stand of larger Douglas fir and incense cedar 20”-40” DBH. This small stand is located in the extreme southern end of the unit. The understory consists of manzanita, oceanspray, conifer regeneration, hazel, chinquapin and canyon live oak. A few areas have Oregon ash in them as well. Portions of the understory have a very heavy brush component. Groundcover consists of dwarf Oregon grape, salal, manzanita and rose.

Analysis: This unit is designated as Matrix land. This stand does not currently meet the RMP guidelines for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would be a stand with approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this stand is a Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2. Favor retaining Douglas fir, incense cedar and well formed ponderosa pine. Place 6-8 ½ acre group selections in this unit to encompass pure stands of white-fir and poorly formed trees. Mark all trees in these group selection areas for removal. Locate these selections no closer then 200’ apart. Portions of unit need full brushing and spacing of conifer regeneration. Space regeneration to 14’ x 14’favoring Douglas fir regeneration for leave. Slash brush species, especially in the western portion of the unit, to create areas for reforestation or natural seeding. Pile all slash and brush and burn piles. Assess the unit post-harvest for planting needs (group selections) and plant with a Douglas fir and minor species mix.

Unit 5-10S T. 33S R. 5W Section 5

Stand Description: This unit consists of a second growth stand of white-fir, Douglas fir and western hemlock. The percentage of white-fir in this stand is the highest in this Planning Area. Stand is mainly small diameter 6”-20” DBH with occasional trees up to 30” in diameter. Basal areas range from 160-260 ft^2. Much of the unit shows signs of past wind/snow damage. Many trees (primary white-fir) have broken tops and prior snow breaks (crooks). Unit also contains many suppressed and dead trees in the understory. Canopy closure is approximately 70%. A few natural openings exist in the stand and there is no natural conifer regeneration present in these openings. The understory is very sparse with very little conifer regeneration and some tanoak. Groundcover consists of tanoak, oceanspray and ferns.

Analysis: This unit is designated as Matrix land. This stand does not currently meet the RMP guidelines for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would be a stand with approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). Mark to retain a basal area of 100 ft^2, favoring larger healthier trees for retention. Remove as much western hemlock and white-fir as possible while still holding to the prescription. Favor larger white-fir trees for leave if a choice between a smaller, poorer quality Douglas fir and larger white-fir does come up. Remove suppressed and broken-top trees. Slash the few areas with brush and selectively space conifer regeneration to a 14’ x 14’ spacing. Slash tanoak. Assess stocking levels and need for fuels treatment within the unit post-harvest. If needed to meet fuels objectives, handpile slash and burn piles. Plant as needed to meet stocking standards with a Douglas fir and minor species mix.

Unit 5-9S T. 33S R. 5W Section 5

Stand Description: This unit consists of a stand of second growth Douglas fir with some white-fir and western hemlock 18”-34” DBH. A few larger (up to 44” DBH) Douglas fir trees are also present in this unit. The unit is mainly a north facing aspect with basal areas of approximately 140-200 ft^2. Canopy closure is approximately 60% and live crown ratios are 40%. This unit has had previous thinning activity approximately 20-25 years ago. An understory of vigorously growing Douglas fir and some western hemlock ranging in size from 2”-5” DBH is also present. There is a very small tanoak component found in the understory as well. This area has also had a fuels reduction treatment in the past so the understory is very sparse in much of the unit. Ground cover consists of tanoak, ferns, dwarf Oregon grape, conifer regeneration and hazel.

Analysis: This unit is designated as Matrix land. This stand does not currently meet the RMP guidelines for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

Desired Future Conditions/Results: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. Mortality of hardwoods and conifer regeneration would decrease. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). Mark to retain a basal area of 100 ft^2, favoring larger healthier trees for retention. Favor larger white-fir trees for leave if a choice between a smaller, poorer quality Douglas fir and larger white-fir does come up. Remove suppressed and broken-top trees. Slash the few areas with brush and selectively space conifer regeneration to a 14’ x 14’ spacing. Slash tanoak. Assess stocking levels and need for fuels treatment within the unit post-harvest. If needed to meet fuels objectives, handpile slash and burn piles. Plant as needed to meet stocking standards with a Douglas fir and minor species mix.

Unit 5-8S T. 33S R. 5W Section 5

<u>Stand Description</u>: This unit contains a second growth stand of Douglas fir, incense cedar, ponderosa pine and scattered white-fir. Diameters are generally 10”-24” DBH with the occasional 30” trees present. Approximately one half of the unit is of smaller diameter timber 10”-14” DBH. Canopy closure in much of the stand is very high; many areas are 80%+. Basal areas range from 100-220 ft^2. Live canopy ratios are approximately 40%. A few areas of suppressed and dying trees are present in the unit. Portions of the unit have a high hardwood component in the overstory. The understory is comprised of tanoak, Pacific madrone, oceanspray and a very little conifer regeneration. Big-leaf maple and alder is present in some of the riparian areas. Groundcover consists of tanoak, dwarf Oregon grape, hazel and ferns.

<u>Analysis</u>: This unit is Matrix land. This stand does not currently meet the RMP requirements for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. There would be fewer hardwoods occupying the stand. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

<u>Avoidance Strategies</u>: Timely site preparation to prevent tanoak from becoming a dominate component in the stand.

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Commercial Thin (CT). Mark to retain approximately 100 ft^2 of basal area. Favor Douglas fir, incense cedar and ponderosa pine for retention. Thin around larger ponderosa pine 25’ off of the drip line. Retain larger, healthier trees. Remove suppressed and poorly formed trees where they are found in the stand. Evaluate unit post-harvest to determine fuels and silviculture treatment needs. These treatments may include slashing, piling and burning of hardwood and brush species (1”-7” DBH), planting portions of the unit, or girdling some larger hardwoods to release the understory of conifer regeneration.

Unit 19-1 and 19-2 T. 32S R. 5W Sections 18&19

<u>Stand Description</u>: Unit 19-1 consists of a stand of mainly ponderosa pine, incense cedar and Douglas fir in the overstory. Diameters range from 12”-36” DBH. Basal area ranges from 100-340 ft^2. The understory of much of the stand has been encroached by Douglas fir and white-fir. The majority of these trees are 3”-7” DBH. The understory also contains decadent California black oak and Oregon white oak, much of which is already dead. There are large patches of Pacific madrone in the unit as well, occupying both the overstory and understory component in areas. Significant wind throw has occurred recently in the southwestern portion of the unit. This area is mainly in the riparian zone, with a few trees in the upland. Groundcover consists of poison oak, grasses and hairy honeysuckle. Unit 19-2 contains a stand of mature ponderosa pine, incense cedar and sugar pine in the eastern portion and mature Douglas fir and sugar pine in the western portion of the unit. The pine site in this unit is very similar to unit 19-1, trees tend to be larger though, 20”-40” DBH. Large California black oak is present in the understory (up to 20” DBH). The Douglas fir portion of this unit is influenced by the riparian zone and contains 20”-36” DBH trees. The understory of this stand is characterized by Douglas fir encroachment in the pine site with trees 8”-20” DBH. The western portion of the unit has patches of smaller diameter trees, mainly Douglas fir and incense cedar 8”-18” DBH.

<u>Analysis</u>: This unit is Matrix land. These stands have portions that do meet the RMP requirements for Regeneration Harvest (mainly 19-2). The entire unit faces the Barton Road and Azalea-Glen Road, as well is easily visible from I-5. The treatment proposed would reduce the visual impact of to these residential Visual Management Resource (VRM) areas.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 30%-40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. There would be fewer hardwoods occupying the stand. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer. Pine species would become dominate in stand once again and display increased vigor and decreased mortality.

<u>Avoidance Strategies</u>: Mark for removal smaller diameter Douglas fir and white-fir in areas where pine/cedar species dominate the overstory. Avoid creating any openings that would be a visual concern for I-5, Azalea-Glen and Barton Roads. Mark for retention trees that in the harvesting and yarding operations would otherwise damage natural conifer regeneration and large black and white oaks. Around the windthrow area, mark to retain a row of trees adjacent to the windthrow, then feather the mark from 120 ft^2 of retained basal area into the desired 80-100 ft^2.

Recommended Treatment: The recommended treatment for this unit is Commercial Thin (CT). Mark to retain a basal area of approximately 80-100 ft^2. 80 ft^2 of basal area retained is desired for the pine/cedar dominated sites in the southern and eastern portions of the unit. 100 ft^2 of basal area retained is desired through the remainder of the unit, characterized by a Douglas fir dominated overstory. In the pine/cedar dominated sites, retain ponderosa pine, sugar pine and incense cedar. Remove encroaching Douglas fir and white-fir from these stands. Favor larger pines and cedar for leave. The Douglas fir portion of the unit, retain sugar pine and ponderosa pine where found. Mark for leave the larger healthier trees; avoid retaining white-fir in this stand. Space pre-commercial sized regeneration to a 14' x 14' spacing, favoring pine and cedar species where possible. Slash Douglas fir and white-fir regeneration up to 25' off of the drip line of retained pine and cedar species in this unit. Assess planting and fuels treatment needs post-harvest. If a planting treatment is needed plant with pine/cedar mix.

Alternative Considered: An overstory removal was considered for this unit, with a focus on retention of pines and cedar. Visual concerns where the main factor in not implementing this prescription.

Unit 4-33 T. 32S R. 5W Section 4

Stand Description: This unit consists of a mature stand of mainly Douglas fir 20”-44” DBH. Basal area in the stand ranges from approximately 200-300 ft^2. Canopy closure in much of the stand is approximately 80%. Significant slowing of incremental growth occurred about 50 years ago. The understory contains quality conifer regeneration in much of the unit. Douglas fir approximately 20’ tall occupies these regeneration areas. Canyon live oak, Pacific madrone and chinquapin also occupy the understory. Groundcover is sparse with bear grass, whipplevine and rattlesnake plantain found scattered throughout the unit.

Analysis: This unit is Matrix land. This stand currently meets the RMP guidelines for Overstory Removal. Much of this stand has reached the culmination of annual increment. The overstory trees are displaying increased mortality and declining vigor. The release of an understory of established conifer regeneration and the planting of a new vigorously growing stand would establish a well stocked stand in the future.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term. Areas of conifer regeneration would be spaced to promote increased vigor and fuller, deeper crown development.

Avoidance Strategies: Mark for retention trees that in the harvesting and yarding operations would otherwise damage natural conifer regeneration.

Recommended Treatment: The recommended treatment for this stand is Overstory Removal (OR). Mark to retain 7-10 large conifers per acre (20”+ DBH) across the diameter classes. Retain large healthy trees, spaced evenly across the unit. Remove suppressed trees and trees with poorly developed crowns (<30% live crown ratio). Pre-commercial thin conifer regeneration to 14’ x 14’ spacing. Slashing/girdling of some hardwoods is desired to release good conifer regeneration. Pile all slash and brush and burn piles. Assess the unit post-harvest for planting needs and if needed plant unit with a Douglas fir and minor species mix to reach stocking standards.

Unit 4-8 T. 32S R. 5W Section 4

<u>Stand Description</u>: This unit consists of medium to large Douglas fir, incense cedar and white-fir 12”-30” DBH. Basal area ranges from 120-240 ft^2. There are many smaller suppressed trees in the understory of this stand. Canopy closure is approximately 70%-80%. The south aspect of the unit has smaller trees (average 16” DBH) and stocking is lower, with basal area averaging 140 ft^2. The understory on the east slope of the unit contains hazel, alder, oceanspray and Pacific madrone. The understory on the southern slope contains canyon live oak, chinquapin, Pacific madrone and some conifer regeneration. There is a much higher hardwood component on the southern aspect of this unit. Groundcover on the east slope is indicating a moister site with ferns and dwarf Oregon grape. The groundcover on the southern aspect contains bear grass, whipplevine and rattlesnake plantain. There is also manzanita bones present on the ground of the southern slope.

<u>Analysis</u>: This unit is Matrix land. This stand does not currently meet the RMP requirements for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 30%-40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. There would be fewer hardwoods occupying the stand. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

<u>Avoidance Strategies</u>: none

<u>Recommended Treatment</u>: The recommended treatment for this unit is Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2 on the east aspect, and to approximately 80-100 ft^2 on the south aspect. Retain the larger healthier trees, favor Douglas fir and incense cedar for leave. Remove white-fir when competing with another species where possible. Thin around the seed trees to 25’ off of the drip line. If any trees appear that in the falling or yarding operation would damage these seed trees, mark them for leave. Slashing and girdling of hardwoods on the southern slope is desired to release conifer regeneration from the understory. Space good quality conifer regeneration to 16’ x 16’ on the south slope and to 14’ x 14’ spacing on the east aspect. Pile all slash and burn piles.

Unit 11-1 T. 32S R. 5W Section 11

Stand Description: This unit consists of large mature Douglas fir, incense cedar, sugar pine and white-fir 24”-50” DBH. Basal area is approximately 200-260 ft^2. This unit contains four approximately 2 acre patch cuts from the High Five timber sale (Unit #2). Many of the white-fir that was retained around the old patch cuts are fading out or is dead, most likely from sun scorch. Much of this unit is occupied by riparian reserves. A few portions of the unit have smaller diameter Douglas fir and white-fir 12”-20” DBH. The understory consists of suppressed and poorly formed conifer species, alder, Pacific yew, chinquapin and vine maple. Groundcover consists of a heavy salal component (up to 4’ high in many areas), vine maple, dwarf Oregon grape, ferns, and some rose in openings.

Analysis: This unit is designated as Matrix land. This stand meets the RMP guidelines for Regeneration harvest. Trees in a state of decline and trees that are spaced too close would be removed to provide for a stand with increased vigor and decreased mortality.

Desired Future Conditions/Results: The desired future condition for this stand in the short term would be a stand that would have two canopy layers. The overstory would be dominated by Douglas fir, incense cedar and sugar pine. The understory would contain conifer regeneration and would be devoid of suppressed and poorly formed trees. The portions of the unit that contain commercial thin sized material would be spaced more evenly and would display increased vigor and crown development. The long term conditions would be a stand that would display canopy gaps and areas of no treatment. Conifer species would eventually fill gaps and a multi-layered stand would result.

Avoidance Strategies: Timely site maintenance is needed to prevent vine maple from a dominate component in the unit and out-competing conifer regeneration.

Recommended Treatment: The recommended treatment for this stand is single tree selection harvest and commercial thin. Mark for removal fading and dying white-fir along the edges of the patch cuts. Single tree selection of large white-fir and fading Douglas fir and incense cedar is desired for removal from the unit. Douglas fir and incense cedar should display a live canopy ratio of less then 25% to be considered for removal. Trees that are displaying flagging are to be targeted for removal as well. Remove suppressed and poorly formed trees from the understory of the stand as well as white-fir. In areas of commercial thin, mark to retain a basal area of approximately 100 ft^2. Retain the largest and healthiest trees, favoring Douglas fir and incense cedar for retention. Brushing of the patch cut areas to release conifer seedling is recommended in all of the patches. Spacing of conifer regeneration to 14’ x 14’ spacing is desired as well in the remainder of the unit. Favor Douglas fir and incense cedar for leave. Assessment of planting needs would be done post-harvest. All slash should be lopped and scattered due to access problems.

Alternatives Considered: A regeneration Harvest was considered for this unit. The stand currently meets the RMP guidelines for a regeneration cut, but due to good incremental growth, the prescription is to remove trees that are displaying decline or stages of mortality.

Units 3-8 SW and 3-11SW T. 33S R. 6W Section 3

<u>Stand Description</u>: These two units consist of mainly large mature Douglas fir and incense cedar 28”-40” DBH. There are scattered sugar pine and ponderosa pine as well. Both units have smaller diameter Douglas fir and white fir in the understory, but unit 3-8SW has a larger component of these trees. Basal area ranges in the understory from 120-240 ft^2. The understory of both of these units consists of Pacific madrone, tanoak and conifer regeneration. In the western portion of unit 3-8SW, there is a stand of smaller timber 8”-18” DBH. Groundcover in these units varies, but in 3-11SW, ferns, dwarf Oregon grape and patches of salal is present. In 3-8SW, the site is a bit drier with grasses, whipplevine and patches of rose present.

<u>Analysis</u>: These two units are on Matrix designated land. Both of these units meet the RMP guidelines for regeneration harvest or overstory removal. The overstory trees are displaying increased mortality and declining vigor. The release of an understory of established conifer regeneration and the planting of a new vigorously growing stand would establish a well stocked stand in the future.

<u>Desired Future Conditions/Results</u>: The short term condition of the action would be stands with multi-layered canopies. The overstory would be dominated by large Douglas fir, ponderosa pine, sugar pine and incense cedar and would be open with approximately 7-10 trees per acre remaining. The mid-story would contain smaller diameter trees that would be thinned and spaced to promote increased vigor and the development of fuller, deeper crowns. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. Conifer regeneration would be spaced to promote increased vigor and crown development. The stand would retain this multi-story structure for the long term.

<u>Avoidance Strategies</u>: Space overstory trees evenly across the unit to prevent creating large openings (greater then 1 acre) that would be a visual concern to the Tunnel Road residents.

<u>Recommended Treatment</u>: The recommended treatments for these stands are: for unit 3-8SW an Overstory Removal/Commercial Thin (OR/CT) and for unit 3-11SW a Regeneration Harvest (RH). Mark to retain 7-10 large conifers per acre (20”+ DBH) across the diameter classes. In areas of commercial thin it is desired to retain a basal area of approximately 80-100 ft^2. Favor 80ft^2 for retention in the drier areas of unit 3-8SW. For the remainder of the unit retain 100 ft^2 of basal area. Favor larger, healthier Douglas fir, incense cedar, sugar pine and ponderosa pine for leave. Slash tanoak in these units. Pre-commercial thinning of good quality conifer regeneration to 14’ x 14’ spacing is desired. Assess the units post-harvest for fuels and planting treatment needs. Plant unit with a Douglas fir and minor species mix in areas that do not meet stocking standards.

Unit 18-14 T. 32S R. 5W Section 18

<u>Stand Description</u>: This unit contains a stand of mainly Douglas fir with scattered incense cedar and ponderosa pine 12”-30” DBH. Portions of the stand towards the south are in a state of decline. Snags and declining tops are present in this southern portion of the unit. The understory contains many suppressed and poorly formed conifers, but is well stocked. The understory layer also contains Pacific madrone, canyon live oak and scattered California black oak and Oregon white oak in the southern end of the unit. Groundcover consists of grasses, whipplevine, rose and some poison oak.

<u>Analysis</u>: This unit is designated as Matrix land. This stand, overall, does not meet the RMP guidelines for Regeneration Harvest. The stand is capable of responding to a release treatment. The treatment proposed would reduce stand density and promote more vigorous growth in the residual trees.

<u>Desired Future Conditions/Results</u>: Short term future conditions would open the canopy of the stand to approximately 40% canopy cover. Reduction of competition on the retained trees would result in increased growth rates. There would be fewer hardwoods occupying the stand. Non-commercial sized conifers would be spaced more evenly to promote better crown development and growth.

Long term conditions would be increased stand vigor and fuller, deeper canopies developing on retained trees. Eventually crown closure would return to near pre-harvest levels. Fewer larger trees would make up the canopy. Larger parent trees would have less competition and remain in stand longer.

<u>Avoidance Strategies</u>: The entire unit faces the Barton Road and Azalea-Glen Road, as well is easily visible from I-5. The treatment proposed would reduce the visual impact of to these residential Visual Management Resource (VRM) areas.

<u>Recommended Treatment</u>: The recommended treatment for this stand is a Commercial Thin (CT). Mark to retain a basal area of approximately 100 ft^2. Favor larger, healthier trees for retention. Retain pine and cedar in the stand, especially towards the southern end. Remove suppressed and poorly formed trees from the understory. Pre-commercial thin areas of quality conifer regeneration to 14’ x 14’ spacing, favor Douglas fir in the northern portion of the unit for retention and pine/cedar in the southern portion. Fuel treatments would be assessed post-harvest and may include cutting of brush and hardwood species as well as piling of slash and burning piles.

Unit 9-7S T. 33S R. 6W Section 9

Stand Description: This unit consists of mainly Douglas fir with some sugar pine and ponderosa pine. Diameters range from about 30”-40” DBH with a few larger 50” DBH trees present in the stand. This unit had been harvested before under the High Five timber sale (Unit 11A) in 1996. Approximately 50% canopy closure was retained in this first entry. The area was slashed/hand piled/burned and planted with Douglas fir, white-fir and incense cedar. A portion along the ridge was left untreated and contains a stand of 30”-40” Douglas fir and sugar pine in the overstory with an understory of 8”-16” Douglas fir and sugar pine. Basal area in this portion of the unit is approximately 300-340 ft^2. The understory for the majority of the unit has been treated by fuels reduction so very few hardwoods are present. Some conifer regeneration is present, though most is small seedling sized. The untreated portion contains tanoak, Pacific madrone, California black oak and hazel. Tanoak is the dominant species in this area though. Ground cover consists of grasses in open areas, poison oak and hardwood stump sprouts.

Analysis: This unit is designated as Matrix land. This stand meets the RMP requirements for Overstory Removal (OR). The overstory trees are displaying increased mortality and declining vigor. The release of an understory of established conifer regeneration and the planting of a new vigorously growing stand would establish a well stocked stand in the future.

Desired Future Conditions/Results: The short term condition of the action would be a stand with two very distinct canopy layers. The overstory would be dominated by large Douglas fir, sugar pine and ponderosa pine and would be open with approximately 7-10 trees per acre remaining. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this two story structure for the long term. Areas of conifer regeneration would be spaced to promote increased vigor and crown development. The portion of commercial thin would retain approximately 40% canopy closure with larger healthier trees retained. Suppressed and poorly formed trees would be removed and retained trees would display fuller, deeper crown development and increased vigor.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Overstory Removal (OR). Mark to retain 7-10 large conifers (20”+ DBH) per acre, favoring the larger healthier trees for retention. In the commercial thin area along the ridge, mark to retain approximately 100 ft^2 of basal area, favoring healthy sugar pines for leave where they are present. Remove suppressed and poorly formed trees in the stand. Slash tanoak throughout unit. Release of conifers under hardwoods is desired through either girdling or slashing. Assess stocking levels post-harvest and plant areas where needed to meet stocking standards. Assess fuel treatment needs post-harvest as well.

Unit 4-20 T. 32S R.5W Section 4

Stand Description: This unit consists of a stand of almost entirely Douglas fir 20”-48” DBH. The overstory is poorly stocked with approximately 15 trees per acre. This unit was partially cut in 1971 and approximately one half of the overstory was removed in a shelterwood system. Many of the trees in this stand are over 120 years old, but are growing extremely slowly, with many just 20”-24” DBH. The understory of this stand contains Douglas fir regeneration 4”-8” DBH, canyon live oak and Pacific madrone. Ground cover is comprised of grasses, canyon live oak and poison oak. This unit is entirely a southern exposure and the soils are ravelly.

Analysis: This unit is designated as Matrix land. This stand meets the RMP requirements for Regeneration Harvest. Much of this stand has reached the culmination of annual increment. The overstory trees are displaying increased mortality and declining vigor. The release of an understory of established conifer regeneration and the planting of a new vigorously growing stand would establish a well stocked stand in the future.

Desired Future Conditions/Results: The short term condition of the action would be a stand with three distinct canopy layers. The overstory would be dominated by large Douglas fir and would be open with approximately 7-10 trees per acre remaining. The mid-story would consist of smaller diameter trees and would retain approximately 40% canopy closure with the larger healthier trees retained. Suppressed and poorly formed trees would be removed and retained trees would display better crown development and vigor. The understory would consist of some residual natural regeneration with additional conifers established after harvest through planting if necessary. The stand would retain this multi-story structure for the long term.

Avoidance Strategies: none

Recommended Treatment: The recommended treatment for this unit is Overstory Removal (OR). Mark to retain 7-10 large conifers per acre across the diameter classes. This unit would have some overstory trees less then 20” DBH retained because these trees are over 120 years of age. Favor retaining the healthier, larger trees. Commercial thin any material over 8” DBH to retain approximately 80-100 ft^2 of basal area. Remove suppressed and poorly formed trees. Pre-commercial thin the understory and retain healthy, undamaged trees. Space conifer regeneration to 14’ x 14’ spacing. Slash canyon live oak and smaller diameter madrone (<7” DBH). Pile all slash and brush and burn piles. Assess stocking levels post-harvest, and plant if necessary with dryer site stock. .

APPENDIX 5. HARVEST UNIT TREATMENTS

		Alt. 2 Proposed Action		Alternative 3 - Fish/Hydro		
Unit #	**Acres**	**Treatment**	**Harvest System**	**Acres**	**Treatment**	**Harvest System**
1-1	264	CT	C,T,H	264	CT	C,T,H
1-2	81	CT	C	0	Defer	
3-1W	16	OR	C,T	16	OR 30%canopy	C,T
3-4W	14	CT	C,T	0	CT	C,T
3-5	58	OR/CT	C/H	58	OR/CT	C/H
3-5A	38	OR/CT	C/H	38	OR/CT	C/H
3-8	13	CT	C	0	CT	C
3-8SW	18	OR/CT	T, H	18	OR/CT	T, H
3-10	8	CT	C	0	CT	C
3-11	28	CT	C(dwnhil)	0	CT	C
3-11SW	5	RH	H	5	RH	H
3-19	20	OR	C	20	OR - 30% canopy	C
4-3S	11	CT	C,T	0	CT	C,T
4-4	18	OR/CT	C (dwnhil)	18	OR/CT	C,H
4-8	28	CT	C	0	CT	C
4-19S	29	CT	C,T	0	CT	C,T
4-20	10	OR	C	0	Defer	
4-20S	3	OR/CT	C	3	OR/CT	C
4-20SA	8	CT	C,T	0	CT	C,T
4-21S	33	CT	C,H	33	CT	C,H
4-24	18	RH	C	0	Defer	
4-33	12	OR	C	12	OR 30% canopy	C
5-1	22	RH	H	0	Defer	
5-2W	45	RH	C,T	19	OR 30% canopy	C
5-4	46	CT	C,T	46	CT	C,T(20ac)
5-7S	25	RH	C,T	25	RH	C,T(13ac)
5-8S	93	CT	C,T	93	CT	C,T(50ac)
5-9S	14	CT	C,T	0	Defer	
5-10S	70	CT	C,T	70	CT	C,T(35ac)
5-12	12	RH	C(dwnhil)	0	Defer	
5-14	9	RH	C	0	Defer	
5-15	8	RH	C	0	Defer	
5-18	9	OR	C	9	CT/OR - 30% canopy	C
5-21S	26	CT	C	26	OR/CT	C

5-26	10	RH	H	0	Defer	
5-27	18	CT	C,H	18	CT	C/H(10ac)
8-1	11	CT	C,T	11	CT	C,T(8ac)
8-2	38	OR	C,T	38	OR/CT	C,(dwnhil),T(5ac)
9-1	106	CT	C,T,H	106	CT	C,T(57ac),H(17ac)
9-2	22	CT	C	22	CT	C
9-6	63	OR/CT	C	63	OR/CT	C
9-7S	64	OR	H	0	Defer	
9-17	48	OR	C,T	48	OR/PCT	C,T
9-18	39	CT	C,T	39	CT/PCT	C,T
9-19	51	OR/CT	C,H	51	OR/CT	C,H
10-1	18	RH	H	18	RH	H
10-1W	27	OR/CT	H	27	Or/CT	H
10-2W	11	OR/CT	H	11	OR/CT	H
11-1	11	GS/ITR	H	11	GS/ITR	H
11-2W	9	OR/CT	C,T	9	GS/CT	C,T
11-3W	53	CT	T,H	53	CT	T,H
13-1	43	CT	C,T	43	CT	C,T
13-3	42	CT	H	42	CT	H
14-2W	13	RH	C,T	13	RH	C,T
15-1	33	RH	C,H	0	Defer	
15-2	122	OR	C,T,H	122	OR	C,T,H
15-3	11	CT	H	0	Defer	
15-8	16	OR/CT	H	16	OR/CT	H
15-9	38	RH/CT	H	38	RH/CT	H
17-1	190	CT	C,T	190	CT	C,T,H
17-4	37	RH	C,H	37	RH	C,H
17-7	48	OR/CT	C	48	OR/CT	C
18-12	31	OR/CT	C	31	OR/CT - 30% canopy	C
18-14	7	CT	C	7	CT	C
19-1	37	CT	H	37	CT	H
19-2	22	CT	H	22	CT	H
20-1	26	RH	C	26	RH	C
21-7	9	CT	C	9	CT	C
21-8	98	RH(Connect.)	C,H	98	RH (Connect.) 30% canopy	C,H
21-15	29	RH/CT(Conn)	C,H	29	RH/CT(Conn)	C,H

21-15A	3	RH	C	3	RH 30% canopy	C
22-2	19	CT	H	19	CT	H
23-2	69	RH/CT Pine	C,T	69	RH/CT Pine	C,T
23-3	9	CT	C	9	CT	Cable
23-5	37	CT	H	37	CT	H
24-4	37	RH/Pine	C	37	RH/Pine	Cable
24-5	5	CT	C	5	CT	C
25-1	32	SW	H	32	SW	H
27-1	37	OR	H	37	OR	H
27-3	38	CT	H	38	CT	H
27-6	20	CT	H	20	CT	H
29-1W	47	RH	C	0	Defer	
29-3W	30	OR/CT	C	30	OR/CT - 30% canopy	C
31-1	143	CT	C,T	143	CT	C,T
31-3	11	RH	C	11	RH	C
31-8	113	CT	C,T	113	CT	C,T
33-2A	9	RH	C,H	9	RH	C,H
33-2B	16	RH	T,H	16	RH	T,H
33-2C	56	CT	C,H	56	CT/GS	C,H
34-1	13	CT	H	13	CT	H
34-2	37	OR	H	37	OR	H
34-3	15	CT	H	15	CT	H
35-1	15	CT	H	15	CT	H
Total Harvest	**3374**			**3009**		

APPENDIX 6. SUMMARY OF ROAD WORK FOR ALTERNATIVES 2 AND 3.

Table A6-1 Miles of Road Maintenance, Reconstruction and Decommissioning.

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
31-5-15		0.75 Roseburg BLM	PRR	Maintenance	5/15-10/15
31-5-34 segment C	Canyon Cr.	0.55 BLM	PRR	Maintenance	5/15-10/15
31-5-33	Fortune Divide	0.93 BLM	ABC	Maintenance	5/15-10/15
31-5-34 A1	Canyon Cr.	0.96 BLM	PRR	Maintenance	5/15-10/15
31-5-34 A2	Canyon Cr.	0.24 BLM	NAT	Maintenance	5/15-10/15
32-5-3 A	Fortune Branch spur	0.68 BLM	ABC	Maintenance	5/15-10/15
32-5-3 B	Fortune Branch spur	0.50 BLM	ABC	Maintenance	5/15-10/15
32-5-3.1 A	Fortune Branch	0.30 BLM	ABC	Maintenance	5/15-10/15
32-5-3.1 B	Fortune Branch	0.35 BLM	ABC	Maintenance	5/15-10/15
32-5-3.2	Fortune Freeway	0.45 BLM	PRR	Maintenance	5/15-10/15
32-5-3.3	E. Fork Fortune Spur	0.26 BLM	ABC	Maintenance	5/15-10/15
32-5-4	Buckhorn Mtn. Spur	0.40 BLM	NAT	Maintenance	5/15-10/15
32-5-4.1	Spur #2	0.20 BLM	NAT	Maintenance	5/15-10/15
32-5-4.2	S. Buckhorn Ridge	0.55 BLM	PRR	Maintenance	5/15-10/15
32-5-5.1	Windy Cr. Spur	0.50 BLM	PRR	Maintenance	5/15-10/15
32-5-5.2	Buckhorn Quarry	0.22 BLM	PRR	Maintenance	5/15-10/15
32-5-7 A	Windy Cr.	0.9 ODF #2234.92	ABC	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
32-5-7 B1	Windy Cr.	0.39 BLM	ABC	Maintenance	5/15-10/15
32-5-7 B2	Windy Cr.	1.93 BLM	PRR	Maintenance	5/15-10/15
32-5-7.1	Windy Cr. Spur S1	0.70 BLM	ABC	Maintenance	5/15-10/15
32-5-8	Buckhorn Ridge	1.89 BLM	ABC	Maintenance	5/15-10/15
32-5-8.1 A	E. Windy Ridge	1.06 BLM	NAT	Maintenance	5/15-10/15
32-5-8.1 B	Windy Ridge	0.25 BLM	NAT	Maintenance	5/15-10/15
32-5-8.2	Windy Ridge	0.25 BLM	NAT	Reconstruct	5/15-10/15
32-5-9 A	E. FK Fortune	0.75 BLM	ASC	Maintenance	5/15-10/15
32-5-9 B	E. FK Fortune	1.82 BLM	ASC	Maintenance	5/15-10/15
32-5-9 C	E. FK Fortune	0.69 BLM	ASC	Maintenance	5/15-10/15
32-5-9.1	Fortune Branch Sec. 9	0.66 BLM	PRR	Maintenance	5/15-10/15
32-5-9.2	Rock Spur	0.40 BLM	PRR	Maintenance	5/15-10/15
32-5-9.5	No Name Rd.	.20 BLM/on transportation map	NAT	Reconstruct	5/15-10/15
32-5-10 A	Fortune Ridge	1.09 BLM	GRR	Maintenance	5/15-10/15
32-5-10 B	M-887 120	0.10 Swanson	NAT	Maintenance	5/15-10/15
32-5-17 A	Fortune Branch	1.74 BLM	ASC	Maintenance	5/15-10/15
32-5-17 B	Fortune Branch	2.52 BLM	ASC	Maintenance	5/15-10/15
32-5-17.1	Fortune Ridge	.50 BLM	PRR	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
32-5-18 A	Bear Ridge	2.98 ODF	NAT	Maintenance	5/15-10/15
32-5-18 B	Bear Ridge	1.01 ODF	NAT	Maintenance	5/15-10/15
32-5-18 C	Bear Ridge	0.24 BLM	NAT	Maintenance	5/15-10/15
32-5-18 D	Bear Ridge	1.18 BLM	NAT	Maintenance	5/15-10/15
32-5-18 E	Bear Ridge	0.16 BLM	NAT	Maintenance	5/15-10/15
32-5-18 F	Bear Ridge	0.48 BLM	NAT	Maintenance	5/15-10/15
32-5-18 G	Bear Ridge	0.15 BLM	NAT	Maintenance	5/15-10/15
32-5-20 A	Buckhorn Mtn.	0.62 BLM	BST	Maintenance	5/15-10/15
32-5-20 B	Buckhorn Mtn.	1.94 BLM	ASC	Maintenance	5/15-10/15
32-5-20 C	Buckhorn Mtn.	2.3 BLM	GRR	Maintenance	5/15-10/15
32-5-22 A	Murphy Rd.	2.10 BLM	ASC	Maintenance	5/15-10/15
32-5-22 B	Murphy Rd.	1.0 BLM	ASC	Maintenance	5/15-10/15
32-5-22 C	Murphy Rd.	0.30 BLM	ASC	Maintenance	5/15-10/15
32-5-22 D1	Murphy Rd.	2.30 BLM	PRR	Maintenance	5/15-10/15
32-5-22 D2	Murphy Rd.	0.11 BLM	PRR	Maintenance	5/15-10/15
32-5-22 D3	Murphy Rd.	1.94 BLM	PRR	Maintenance	5/15-10/15
32-5-22 E	Murphy Rd.	0.88 BLM	PRR	Maintenance	5/15-10/15
32-5-30 A	Swamp Cr.	0.66 BLM	ASC	Maintenance	5/15-10/15
32-5-30 B	Swamp Cr.	3.45 BLM	ASC	Maintenance	5/15-10/15
32-5-30.1 A	Woodford	1.75 BLM	ASC	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
32-5-30.1 B	Woodford	0.16	ASC	Maintenance	5/15-10/15
32-5-31	E Spur	0.28 BLM	PRR	Maintenance	5/15-10/15
32-5-31.1	F Spur	0.25 BLM	PRR	Maintenance	5/15-10/15
32-5-31.2	G Spur	0.22 BLM	PRR	Maintenance	5/15-10/15
32-5-31.3	H Spur	0.11 BLM	PRR	Maintenance	5/15-10/15
32-5-31.4	Lump Spur	0.35 BLM	PRR	Maintenance	5/15-10/15
32-6-3	Spur Road	2.60 BLM	NAT	Maintenance	5/15-10/15
32-6-3.2 A1	Wood Cr. Spur	0.32 M-877	PRR	Maintenance	5/15-10/15
32-6-3.2 A2	Wood Cr. Spur	0.11 BLM	NAT	Maintenance	5/15-10/15
32-6-3.2 A3	Wood Cr. Spur	0.16 BLM	NAT	Maintenance	5/15-10/15
32-6-3.2 B	Wood Cr.	0.41 BLM	NAT	Maintenance	5/15-10/15
32-6-5	SH Boundary	0.49 BLM	GRR	Maintenance	5/15-10/15
32-6-9 A	Wood Cr. Spur #1	1.32 Boise	PRR	Maintenance	5/15-10/15
32-6-9 B	Wood Cr. Spur #1	1.26 Boise	PRR	Maintenance	5/15-10/15
32-6-9 C	Wood Cr. Spur #1	0.25 Boise	PRR	Maintenance	5/15-10/15
32-6-13	Mud Hole	1.95 ODF	NAT	Maintenance	5/15-10/15
32-6-15	Myrtle Wood	2.01 BLM	ASC	Maintenance	5/15-10/15
32-6-15.1	Redwood	0.68 BLM	ASC	Maintenance	5/15-10/15
32-6-15.2	Softwood	0.27 BLM	ASC	Maintenance	5/15-10/15
32-6-17	McCullough Cr. Spur	0.32 ODF	ASC	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
32-6-17.1 A,B,C	E. McCullough	4.17 BLM	ASC	Maintenance	5/15-10/15
32-6-17.2	E. McCullough Ridge	0.98 BLM	ASC	Maintenance	5/15-10/15
32-6-17.3	E. McCullough “A” spur	0.27 BLM	ASC	Maintenance	5/15-10/15
32-6-17.4	E. McCullough “B” spur	0.26 BLM	ASC	Maintenance	5/15-10/15
32-6-17.5	E. McCullough “C” spur	0.29 BLM	ASC	Maintenance	5/15-10/15
32-6-19	McCullough Cr.	0.69 ODF	ASC	Maintenance	5/15-10/15
32-6-21 A	Fir View	0.59 BLM	PRR	Maintenance	5/15-10/15
32-6-21 B	Fir View	0.07 M887-112 (Swanson)	PRR	Maintenance	5/15-10/15
32-6-21.1 A	What Fir	0.14 BLM	NAT	Maintenance	5/15-10/15
32-6-21.1 B	What Fir	0.02 M887-112 (Swanson)	PRR	Maintenance	5/15-10/15
32-6-21.2 A	What Fir	0.34 Roseburg R M700-104	NAT	Maintenance	5/15-10/15
32-6-21.2 B	What Fir	0.23 BLM	NAT	Maintenance	5/15-10/15
32-6-21.3	What Name Rd.	0.37 BLM	NAT	Maintenance	5/15-10/15
32-6-22 A	Wood Cr.	1.74 Boise	PRR	Maintenance	5/15-10/15
32-6-22 B	Wood Cr.	0.68 Boise	PRR	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
32-6-23	Sap Wood	0.47 BLM	ASC	Maintenance	5/15-10/15
32-6-29	Glendale Overlook	0.28 BLM	ASC	Maintenance	5/15-10/15
32-6-29.1	Rose Bird	0.62 BLM	PRR	Maintenance	5/15-10/15
32-6-29.2	Arnie	0.58 BLM	NAT	Maintenance	5/15-10/15
32-6-30	Jeep	0.19 BLM	NAT	Maintenance	5/15-10/15
33-5-4	Buckhorn Mtn. Spur	0.40 BLM	NAT	Maintenance	5/15-10/15
33-5-4.1 A	Leavens Gulch	0.64 BLM	ASC	Maintenance	5/15-10/15
33-5-4.1 B	Leavens Gulch	0.64 BLM	PRR	Maintenance	5/15-10/15
33-5-4.3	Tennessee Jed	0.59 BLM	PRR	Maintenance	5/15-10/15
33-5-5		0.16 BLM	PRR	Reconstruct	5/15-10/15
33-5-5.2	Z Spur	0.30 BLM	PRR	Maintenance	5/15-10/15
33-5-6 A	Swamp Ford Rd.	0.65 BLM	PRR	Maintenance	5/15-10/15
33-5-6 B	Swamp Ford Rd	0.11 BLM	NAT	Maintenance	5/15-10/15
33-5-9 A	Levens gulch	1.18 BLM	ASC	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
33-5-9 B	Levens gulch	0.30 BLM	ASC	Maintenance	5/15-10/15
33-5-9 C	Levens gulch	BLM		Maintenance	5/15-10/15
33-5-9 D	Levens gulch	0.40 PVT		Maintenance	5/15-10/15
33-5-10.3 A	Wolf Cr. Spur	3.17 BLM	ASC	Maintenance	5/15-10/15
33-5-10.3 B	Levens gulch	0.55 BLM	PRR	Maintenance	5/15-10/15
33-6-1	Swamp Cr.	0.78 BLM	NAT	Maintenance	5/15-10/15
33-6-1.1 A	Swamp Ford Peak	0.40 BLM	ASC	Maintenance	5/15-10/15
33-6-1.1 B	Swamp Ford Peak	0.20 C&D M-824	ASC	Maintenance	5/15-10/15
33-6-1.1 C	Swamp Ford Peak	0.70 BLM	ASC	Maintenance	5/15-10/15
33-6-1.2	D Spur	0.14 BLM	PRR	Maintenance	5/15-10/15
33-6-10 A	Farmer Gulch Jeep Rd.	0.02 BLM	NAT	Maintenance	5/15-10/15
33-6-10 B	Farmer Gulch Jeep Rd.	0.40 Superior M-887-B	NAT	Maintenance	5/15-10/15
33-6-10 C	Farmer Gulch Jeep Rd.	0.02 BLM	NAT	Maintenance	5/15-10/15
33-6-10 D	Farmer Gulch Jeep Rd.	0.28 BLM	NAT	Maintenance	5/15-10/15

Road Number	Road Name	Length/Control	Surface	Proposed	Work Period
33-6-10 E	Farmer Gulch Jeep Rd.	0.66 BLM	NAT	Maintenance	5/15-10/15
33-6-10 F	Farmer Gulch Jeep Rd.	0.04 BLM	NAT	Maintenance	5/15-10/15
33-6-10 G	Farmer Gulch Jeep Rd.	0.75 BLM	NAT	Maintenance	5/15-10/15
33-6-10 H	Fire Break Rd	0.50 Silver Butte M-308	NAT	Reconstruct	5/15-10/15
Existing BLM Spur #1 Off 32-6-13	32-6-18 spur	0.25 BLM	NAT	Reconstruct	5/15-10/15
Existing Fire Spur	32-6-24 Ridge Fire road	.40 BLM/Swanson	NAT	Reconstruct	5/15-10/15
Swanson spur #1	Ridge Rd	.75 Swanson	NAT	Maintenance	5/15-10/15
Swanson spur #2	Ridge Rd	1.50	NAT	Maintenance	5/15-10/15
33-6-9		0.14 BLM	NAT	Decommission	5/15-10/15
32-5-9.2		0.40 BLM	NAT	Decommission	5/15-10/15
Jeep Spur 32-5-17	32-5-17	0.40 BLM	NAT	Reconstruction Decommission (0.2)	5/15-10/15
32-5-17	C & D spur	0.50	NAT	Reconstruction	5/15-10-15

Definitions:

BST Bituminous Surface Treatment
ABC Aggregate Base Course
ASC Aggregate Surface Course
GRR Grid Rolled Rock
PRR Pit Run Rock
NAT Native Surface

Table A6-2. Road Construction miles by alternative

Unit Number to Access	Construction Type	Miles	Action Alternative
3-5	Temp	0.05	2,3
3-5A	Temp	0.04	2,3
4-8,4-33	Temp	0.21	2,3
8-1	Temp	0.06	2,3
5-15	Temp	0.25	2
9-6	Temp	0.45	2,3
9-2,9-17	Temp	0.11	2,3
9-1	Temp	0.33	2,3
31-1	Temp	0.40	2,3
31-1	Temp	0.16	2,3
31-1	Temp	0.31	2,3
5-9S	Temp	0.45	2
13-2,13-1	Temp	0.54	2,3
11-2W, 11-3W	Temp	0.50	2,3
5-2W	Temp	0.50	2,3
21-8	Temp	0.05	2,3
23-2	Temp	0.19	2,3
15-2	Temp	0.09	2,3
Ridge Road	New	0.40	2,3
Ridge Road	New	0.09	2,3
21-7	Temp	0.08	2,3
3-4W	Temp	0.07	2,3
23-3 (ridge spur)	Temp	0.05	2,3
24-5, (ridge spur)	Temp	0.15	2,3
+18-14	Temp	0.07	2,3
4-24	Temp	0.21	2
4-24	Temp	0.13	2
4-20S	Temp	0.19	2,3
5-14	Temp	0.04	2,3
17-4	Temp	0.11	2,3
31-8	Temp	0.11	2,3
1-1	Temp	0.20	2,3
17-1	Temp	0.17	2,3

APPENDIX 7 HAZARDOUS FUELS REDUCTION UNITS

Unit Number	Acres	Treatment Type
W-3-1	110	S/HP/PB
W-3-2	13	S/HP/PB/UB
W-4	86	S/HP/PB/UB
W-5-1	39	S/HP/PB/UB
W-5-2	93	S/HP/PB/UB
W-5-3	11	S/HP/PB/UB
W-6	19	S/HP/PB/UB
W-8	26	S/HP/PB
W-9-1	23	S/HP/PB/UB
W-9-2	35	S/HP/PB/UB
W-11	436	S/HP/PB/UB
W-17	40	S/HP/PB/UB
W-31-1	10	S/HP/PB/UB
W-31-2	38	S/HP/PB/UB
W-31-3	9	S/HP/PB/UB
S/HP/PB	136	
S/HP/PB/UB	852	
Total Acres	988	

S = Slashing; HP = Hand Pile; PB = Pile Burn; UB = Underburn

APPENDIX 8 NOXIOUS WEEDS

Specialist Report Memo

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Rachel Showalter, Botanist, Glendale Resource Area
Re: Noxious Weeds Rationale Report for the Westside Planning Area
Date: May 3, 2006

Westside – Noxious Weeds – NOT AFFECTED

Units with the Westside Planning Area were surveyed for noxious weeds in the spring of 2004 and 2005. The Planning Area is known to have noxious weeds along many roadsides, and 10 populations of *Cirsium arvense* (Canada thistle), 5 populations of *Cirsium vulgare* (Bull thistle), 9 populations of *Cytisus scoparius* (Scotchbroom), 14 populations of *Rubus discolor* (Himalayan blackberry), 1 population of *Senecio jacobaea* (Tansy ragwort), 1 population of *Chondrilla juncea* (Rush Skeleton weed), and 10 populations of *Centaurea pratensis* (aka *C. debeauxii*) (Meadow knapweed) were documented within or directly adjacent to proposed units (Table 1-1). Based on these population sizes, per noxious weed reports provided by professional botany contractors, the Glendale botanist estimated that less than 1% of the harvest unit / fuels treatment / road construction/decommission acreage harbor noxious weeds. The maximum square footage occupied by all noxious weed species is approximately 1,045,142.7 sq. ft (24.04 acres), or 0.55% of the treatment units in Alternative 2 (4399 acres), and 0.60% of the treatment units in Alternative 3 (4030.1 acres). For the purposes of this report, treatment units were considered as acreage within the Planning Area subject to any ground-disturbing activity, including timber harvest activities, stand-alone fuels treatments, and road construction/decommission. The calculation(s) of 0.55 % and 0.60% are at the high end, as they assume 100% coverage within a given population which is rarely attained, with the exception of Himalayan blackberry.

Table 1-1. Plant Surveys Revealing Noxious Weed Species in the Westside Planning Area

2004/5 Plant Surveys Revealing Noxious Weed Species in the Westside Planning Area Units				
Location in Township (T), Range (R), Section (S)	**Species**	**Coverage in Sq. Feet**	**Oregon Department of Agriculture Designation**	**Plant Description / Habitat Requirements**
T32S-R5W-S1 T32S-R5W-S5 T32S-R5W-S8 T32S-R5W-S33 T32S-R6W-S5 T32S-R6W-S29 T33S-R5W-S9 T33S-R6W-1 T33S-R6W-S3	Scotch broom	87000 50 130 7800 108 100 300 106 100	B*	Scotch broom is a long-lived, brushy, early seral colonizer which does not grow well in forested areas, but invades rapidly following logging, land clearing, and burning (Mobley, 1954). Scotch broom is generally intolerant of shade and would not grow in heavily shaded places (DiTomaso, 1998; Peterson and Prasad, 1998), and is typically shaded out once native species are established (Bossard, 2000; Williams, 1983) or forest canopy closes (Sawyer et. al, 2000).

T32S-R5W-S8 T32S-R5W-S9 T32S-R5W-S18	Bull thistle	320 100 120	B*	Bull thistle is an early successional biennial species that establishes well in open, disturbed sites, and is an important weed in clearcuts and conifer plantations in the western U.S. (Rejmanek et al, 1996). Populations of bull thistle tend to be short lived, establishing after disturbance, dominating for a few years, and then declining as other vegetation recovers (Cox, 1970; McDonald , 1999). Doucet and Cavers (1996) note that bull thistle is absent from densely shaded areas. A review by Klinkhamer and de Jong (1993) indicates that bull thistle is almost absent if light is reduced to less than 40% of full sunlight.
T32S-R5W-S5 T32S-R5W-S8 T32S-R5W-S9 T32S-R5W-S18 T32S-R6W-S3 T32S-R6W-S15 T32S-R6W-S21 T32S-R6W-S29 T33S-R5W-S5	Himalayan blackberry	1330 50 479229.1 120 500 135 110 70 1168	B*	Himalayan blackberry is a robust, clambering or sprawling, evergreen shrub which grows up to 9.8 feet (3 m) in height (Munz, 1974). Himalayan blackberry typically grows in open weedy sites, such as along field margins, railroad right-of-ways, roadsides, and riparian areas (Crane, 1940; Hitchcock et. al, 1973; Laymon, 1984; Roberts, 1980).
T32S-R5W-S3 T32S-R5W-S4 T32S-R5W-S31 T32S-R5W-S33 T32S-R6W-S15 T33S-R5W-S5 T33S-R6W-S3 T33S-R6W-S15	Meadow knapweed	480 540 1000 500 2400 9930 1000 9000	B*	Meadow knapweed, a hardy biennial/perennial, favors moist roadsides, sand or gravel bars, river banks, irrigated pastures, moist meadows, and forest openings (ODA, 2005). Prefers full sun and well-drained soils. Many infestations start on rights-of-way or from infested gravel or fill. Seeds are often transported by automobiles, contaminated fill and gravel, and by wildlife (King Co., DNR, 2004).
T32S-R5W-S4	Tansy ragwort	27	B*	Tansy ragwort, a biennial herb, requires sunlight and a disturbed site to establish. It is often found on roadsides, contributing to the spread of new infestations. Tansy ragwort would establish in disturbed sites including roadsides, pastures, and forested areas recently harvested for timber (Sweeney et al. 1992). The cinnabar moth (*Tyria jacobaeae*) is the biological agents effectively used to control tansy ragwort in Oregon, California, and Washington (Rees et. al, 1996).
T32S-R5W-S9 T32S-R5W-S17 T32S-R6W-S1 T32S-R6W-S3 T32S-R6W-S15 T32S-R6W-S21 T33S-R5W-S5	Canada thistle	300 435644.6 240 800 90 300 3310	B*	Generally, Canada thistle establishes and develops best on open, moist, disturbed areas, including ditch banks, overgrazed pastures, meadows, tilled fields or open waste places, fence rows, roadsides, and campgrounds; and after logging, road building, fire and landslides in natural areas

T33S-R6W-S1 T33S-R6W-S15		80 540		(Romme et al, 1995). Canada thistle is an early seral species, susceptible to shading, and grows best when no competing vegetation is present (Donald, 1994). Canada thistle growth may be discouraged in disturbed natural areas if suitable native species are seeded densely enough to provide sufficient competition (Haber, 1997).
T33S-R6W-S1	Rush skeletonweed	15	B*	Rush skeletonweed is a long-taprooted biennial/perennial which prefers two soils types found in the pacific northwest: the sandy to gravely and well drained soils, and the shallow soils over bedrock, typical in the channeled scablands (Old, 1981). Rush skeletonweed is primarily a species of disturbed roadsides although it is also found on river banks, dry river beds, degraded coastal dunes, and eroded ground (McVean, 1966). Seeds are commonly transported via wind currents, and are often carried up to 20 miles from the original seed source (McLellan, 1991).
Total Sq. feet		1045142.7 sq. ft ~ 24.04 ac		

* "B" designation; a weed of economic importance which is regionally abundant but which may have limited distribution in some counties. Where implementation of a fully integrated statewide management plan is not feasible, biological control shall be the main control approach (ODA, 2005).

Over the last 150 years activities such as motor vehicle traffic, recreational use, rural and urban development, timber harvest, road construction, and natural process have introduced and transported noxious weeds into the Rogue Valley. Noxious weeds are spread by the wind and by seed via attachment to vehicles and vectors such as humans, animals, and birds, and are able to grow on suitable habitat (generally considered as any newly disturbed ground and/or an influx of light due to canopy removal). Since the 1970's a recognition that weeds were causing environmental damage resulted in the passage of State noxious weed laws, the Carson-Foley Act of 1968 – Plant Protection Act of 2000, and Presidential executive orders like Invasive Species E.O. 13112, which directs federal agencies to combat the noxious weeds on federal lands. Additional direction is provided by the Medford District RMP, which states the district is to "contain and/or reduce noxious weed infestations on BLM-administered land ...(p. 92)," and "...survey BLM-administered land for noxious weed infestations…(p. 93)." These RMP directions for weed management are intended to be met at a landscape level; whether the direction is achieved is not intended to be measured at the site specific level nor with the implementation of each project. Thousands of acres of weed treatments have occurred on federal (and non-federal) lands over the last decade across the Medford District with the RMP-driven objective of containing or reducing – not eradicating - noxious weed populations (Budesa, 2006). In an effort to continue to contain and/or reduce noxious weeds on federal land, the BLM proposed to treat known weed populations within the Glendale Resource Area, including the Westside Planning Area, under an agreement with the Douglas County Soil and Water Conservation District, using Title II funds obtained in 2004. This agreement is separate of the Westside Planning effort and was analyzed under the Medford the District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14*.

Environmental Consequences of the Westside Project Implementation

Alternative 1 (No Action) – Direct and Indirect Effects

Under the No Action Alternative, noxious weeds within the Planning Area would continue to spread into suitable habitat at an unknown rate. The rate at which noxious weeds spread is impossible to quantify, as it depends on a myriad of factors including, but not limited to, logging on private lands, motor vehicle traffic, recreational use, rural and urban development, and natural processes (Northwest Area Noxious Weed Control Program EIS, p. 59). The following table (1-2) illustrates how each of these activities affects noxious weed dispersal.

Table 1-2: Factors Affecting the Determination of the Rate of Noxious Weed Spread

Activity	Role in Potential Noxious Weed Seed Dispersal
Private Land	Private lands host a perpetual source for noxious weed seed, which can be dispersed when seeds attach to tires, feet, fur, feathers or feces, or when natural processes such as wind and/or flooding events transport the seed from its source to another geographical vicinity.
Logging on Private Lands	Logging activity presents a key dispersal opportunity for noxious weed seeds per 1) attachment to tires/tracks of mechanized logging equipment, tires of log trucks, and various other logging-related substrates which subsequently transport the seed from its source to another geographic vicinity, 2) creation of openings for potential noxious weeds colonization and 3) a lack of PDFs – such as equipment/vehicle washing, etc. - which attempt to reduce the activity's spread of noxious weed seeds.
Motor Vehicle Traffic (including Log Trucks)	Roads on public land are for public use, which results in a plethora of seed-dispersing activities occurring on a daily basis. Private landowners use public roads to haul logs, undertake recreational pursuits, and/or access their properties. This transportation often occurs along BLM-administered roads, which are situated within a checkerboarded ownership arrangement. How or when seed detachment occurs is a random event could take place within feet or miles from the work site/seed source, presenting a high likelihood of detachment on public lands.
Recreational Use	The Public often recreates on BLM-managed public lands, and can spread seed from their residences to public land in a variety of ways such as attachment to vehicle tires, hikers' sox, shoes, or other clothing, the fur of domesticated animals, etc.
Rural and Urban Development	Rural development occurring within the checkerboarded land arrangement often requires public landowners to acquire a Right of Way (ROW) from the BLM to legally access their parcel(s). These ROWs, or use of BLM-administered roads is often granted (Groves,

	2006). Please refer to 'Motor Vehicle Traffic' and 'Private Land,' for clarification of how this affects the spread of noxious weeds from private to public lands.
Natural Processes	Wind, seasonal flooding, and migration patterns of birds/animals are a few natural processes that potentially spread noxious weeds, especially from private land to public land. Wind carries seeds, and deposits them at random intervals. High water caused by flooding reaches vegetation (often harboring a noxious weed component) growing on the banks of rivers/creeks/streams, and deposits seeds downstream.

The abovementioned activities would contribute to noxious weed spread, which could degrade some elements of the environment. To predict the rate of this degradation would be highly speculative, as the extent of weed expansion is dependent on so many factors that it is considered impossible to quantify. The degree of degradation would depend on the noxious weed species, as some, such as scotch broom and meadow knapweed, are more intrusive than others. The more aggressive species mentioned in Table 1-2 - specifically scotch broom and meadow knapweed - are slated for treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14* under a separate project. However, the success of implementing the weed management plan would be temporary, as logging on non-federal lands, recreational use, rural and urban development, natural processes and vehicle traffic would continue to spread noxious weed populations into the Planning Area.

Indirect effects of noxious weed spread include the potential degradation of wildlife habitat (Rice et. al. 1997, Harris and Cranston 1979), a decline in natural diversity (Forcella and Harvey 1983; Tyser and Key 1988; Williams 1997), and decline in water quality (Lacey et al. 1989); however, a very small amount of Westside unit acreage (less than 1% of unit acreage under both Alt. 2 and Alt. 3) is covered by noxious weeds, making it difficult to quantify any potential decline in ecosystem health related to existing noxious weed populations, or to quantify the potential decline in ecosystem health related to any additional noxious weed populations potentially established by the activities described in Table 1-2.

<u>Alternative 2 (Proposed Action) – Direct and Indirect Effects</u>

In the short term (approximately 1-5 years), proposed activities within the Planning Area would result in the reasonable probability of spreading noxious weeds. However, the rate at which this potential spread would occur is unknown due to the indistinguishable causal effect of other activities and factors listed in table 1-2 on the spread of noxious weeds. Openings, caused by logging (3374 acres), stand-alone fuels treatments (988 acres), and road construction/decommissioning (10.27 miles, (37 acres)), would provide suitable habitat for noxious weeds to colonize. In addition, during project implementation, increased vehicle traffic could increase, or at least perpetuate, weed infestations along road systems because of seed dispersal. Openings and disturbance provide the greatest opportunity for the establishment of noxious weeds. In an effort to address the potential for project activities to increase the rate of spread of noxious weeds, Project Design Features

(PDFs) have been included in the project to decrease the potential spread of weeds associated with the proposed action. Project Design Features include washing equipment prior to moving it on-site, operating vehicles/equipment in the dry season, and seeding and/or planting newly created openings with native vegetation to reduce the potential establishment of noxious weeds. These PDFs are widely accepted and utilized as Best Management Practices (BMPs) in noxious weed control strategies across the nation (Thompson, 2006). Table 1-3 delineates the project design features and their expected implementation results.

Table 1-3: Project Design Features and Expected Implementation Results

Project Design Feature (PDF)	Result of Implementing PDF
Washing vehicles / equipment	Removes dirt that may contain viable noxious weed seeds, thereby reducing the potential for noxious weed spread
Operating vehicles/equipment during the dry season	Reduces the potential for viable noxious weed seed to be transported and dispersed via mud caked on the undercarriages/tires/tracks of logging equipment.
Seeding and/or planting newly created openings with native seed vegetation.	Introduces native vegetation to the site prior to noxious weed seed recruitment, allowing native plants an advantageous jump-start in reestablishment, which reduces the potential for noxious weed infestation.

Implementing the PDFs that reduce the potential spread of noxious weeds associated with the proposed action, and using native species for seeding/planting newly disturbed openings is expected to result in a similar potential of noxious weed expansion as associated with the No Action Alternative.

In the long term (5-100 years), tree canopies would eventually expand and reduce light levels, which in turn would prevent weeds from growing and expanding within treated areas, because populations decline as the amount of light reaching the plants diminishes. Consequently, in the long term, remaining weed populations would be confined to the road prism and adjoining (private) disturbed land as canopy is re-established in treated areas over time.

The effect of implementing Alternative 2 could possibly result in the establishment of new noxious weed populations. Although the *immediate* potential for weed spread would be less with the No-Action Alternative than for the Proposed Action, the potential for the spread of existing noxious weeds and the introduction of new species is considered similar for both alternatives, because of the inclusion of PDFs in Alternative 2, and the fact that under the "no action" alternative, populations would continue to establish and spread due to seed transport by vehicular traffic, wildlife, and other natural dispersal methods listed in Table 1-2. Indirect effects associated with noxious weed population enlargement are similar to those mentioned in the No Action Alternative, and are known to include, generally, declines in the palatability or abundance of wildlife and livestock forage (Rice et al., 1997), declines in native plant diversity (Forcella and Harvey, 1983; Tyser and Key, 1988; Williams, 1997), reductions in the aesthetic value of the landscape, encroachment upon rare plant populations and their habitats, potential reductions in soil stability and subsequent increases in erosion (Lacey et. al, 1989), and an overall decline of ecosystem health. However, considering implementation of Alternative 2, there are three main reasons why potential weed establishment that might be caused by the proposed action is not expected to result in a detectable effect to overall ecosystem health. First, surveys indicate that a very small percentage - less than 1% of acreage within the Planning Area units - are affected by noxious weeds. Second, these sites located in units proposed for treatment have been reported during predisturbance surveys, and are proposed for weed treatment under Medford District's *Integrated Weed Management Plan and Environmental Assessment OR-110-98-14*, which means that known populations would be treated, bringing the acreage in the Planning Area affected by noxious weeds closer to 0% until ongoing activities listed in Table 1-2 re-introduce weeds into the planning area. Third, as aforementioned, Project Design Features (PDFs) have been established to minimize the rate at which project activities might potentially spread noxious weed seed from outside/adjacent sources.

<u>Alternative 3 – Direct and Indirect Effects</u>

The main difference between Alternative 2 and Alternative 3 is the acreage affected by activities. For Alternative, 3, openings caused by logging equal 3009 acres, stand-alone fuels treatments equal 988 acres, and road construction/decommissioning equals 9.19 miles, or 33.1 acres. Direct and indirect effects for Alternative 3 mirror those delineated for Alternative 2.

<u>Alternative 2 (Proposed Action) & Alternative 3 Cumulative Effects</u>

In order to address the cumulative effects of the proposed action on the spread of noxious weed encroachment, the condition of non-federal lands must be considered. However, there is no available or existing data regarding noxious weed occurrence on local non-federal lands. Therefore, for purposes of this analysis, BLM assumes that 1) there is a perpetual source of noxious/invasive weeds on non-federal lands that can spread to federal lands, especially when the land ownership is checkerboard, as within the Planning Area, and 2) conversely that noxious weeds are not established on these lands, and therefore there is a need to reduce the risk of spread of noxious weeds from the federal lands to the adjoining non-federal lands. Seeds are spread by the wind, by animal/avian vectors, natural events, and by human activities - in particular through soil attachment to vehicles. BLM's influence over these causes of the spread of noxious weeds is limited to those caused by human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weed establishment, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds, it may only reduce the risk or rate of spread.

Given the unpredictable vectors for weed spread, such as the vehicle usage by private parties, wildlife behavior, and wind currents, it is not possible to quantify with any degree of confidence the rate of weed spread in the future, or even the degree by which that potential would be increased by the proposed action.

Foreseeable activities within the Planning Area are expected to be similar to past and current activities: motor vehicle traffic, recreational use, rural and urban development, timber harvest, road construction, firewood collection. These types of activities could result in new disturbed sites available for colonization by existing noxious weed populations, and they do offer the possibility of introduction of new noxious weed species to the Planning Area under any alternative, including the no-action alternative. As stated above, there is no available or existing data concerning the rate of weed spread occurring on either federal or non-federal lands as a consequence of these types of activities. Also, as discussed above, there is no information on what, if any, increase in the rate of weed spread the proposed action would cause, and hence, it is not possible to quantify with any degree of confidence what the incremental effect of the proposed action on the spread of noxious weeds would be when added to the existing rate of weed spread caused by past, present, and future actions.

PDFs exist to reduce the potential that the proposed action would contribute to the spread of weed seed and establishment of new populations. PDFs are not intended or expected to completely eliminate any possibility that the proposed action would contribute to the spread of weed seed and establishment of new populations; however, PDFs ensure that any incremental contribution of the proposed action to the spread of weeds, when added to the rate of weed spread caused by past, present, and future actions, would be so small as to be incapable of quantification or distinction from background levels.

As described above, PDFs for this project include washing vehicles/equipment, operating in the dry season, and seeding/planting newly created openings with native vegetation. BLM, and other federal and nonfederal organizations involved in combating noxious weed spread, routinely utilize these PDFs in noxious weed control strategies. These PDFs are widely accepted as Best Management Practices (BMPs), as they are inexpensive to implement, easily attainable, and accomplish the objective of reducing the potential of spreading noxious weeds as a result of project-oriented activities.

There is no available data on the background rate of weed spread, and additional data collection on the rate of weed spread would not reduce the inherent speculation in predicting the future activities of private parties and wildlife and the resultant rate of weed spread. Further, additional data collection would not reduce the inherent speculation in predicting incremental effects of the proposed action on the spread of weeds because of (1) the unpredictable natural factors that largely determine whether weeds would spread after project activities, (2) the unlikelihood that future data collection would be able to detect or measure any difference between background rates of weed spread and the rate of weed spread as affected by the proposed action and correspondingly reduced by PDFs, and (3) the included PDFs that would reduce, if not eliminate, any project effects on the rate of weed spread that would make the already undetectable effects of the proposed action even more undetectable. Finally, further data collection on the rate of spread would not alter the

PDF techniques already being applied to reduce that rate of spread. It cannot be over emphasized that under the “no action” alternative, noxious weeds are likely to spread over time regardless of whether or not the Westside Project occurs, and that rate would not be altered to any detectable degree by the proposed action.

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APPENDIX 9 SPECIAL STATUS PLANTS

Specialist Report Memo

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Rachel Showalter, Botanist, Glendale Resource Area
Re: Special Status Plants Rationale Report for the Westside Planning Area
Date: May 15, 2006

T/E Plants – NOT PRESENT, NOT AFFECTED

Of the four federally listed plants on the Medford District (*Fritillaria gentneri, Limnanthes flocossa* ssp. *grandiflora, Arabis macdonaldiana,* and *Lomatium cookii,* only *Fritillaria gentneri* has a range and habitat which extends into the Glendale Resource Area. Although a few units of the Westside Planning Area are within the range and habitat of *F. gentneri*, as determined by the 2004 US Fish and Wildlife Service Biological Opinion, vascular plant surveys were conducted in the spring of 2004 and 2005, and no *Fritillaria gentneri* populations were found. There would be no anticipated effect from the proposed action on any federally listed plant.

Bureau Special Status Plants – PRESENT, NOT AFFECTED

Vascular plant surveys were conducted in the spring of 2004 and 2005, and surveys were completed in the spring of 2005 for lichens and bryophytes. Professional botanists surveyed the Planning Area units using intuitive controlled methodology, wherein areas supporting high potential habitat were surveyed more intensively. Surveys revealed 5 bureau special status vascular plant sights and 11 Survey and Manage vascular plant sites: 4 sensitive species sites (4 *Limnanthes gracilis var. gracilis*), 1 assessment species site (*Clarkia heterandra*), and 11 S&M Category C sights (4 *Cypripedium fasciculatum* and 7 *Cypripedium montanum*)(Table 1-1). Three bureau tracking species sites (1 *Enemion stipitatum,* and 2 *Mimulus douglasii)* were also documented during pre-disturbance surveys.

Nonvascular surveys, completed in spring 2005, resulted in 3 new bureau special status nonvascular plant sites, all of which are Assessment species (2 *Funaria muhlenbergii* and 1 *Crumia latifolia*). Seventy-nine tracking species sites (*29 Chaenotheca ferruginea, 11 Chaenotheca furfuracea, 1 Chaenotheca subroscida, 1 Hedwigia detonsa, 4 Leptogium rivale, 6 Sarcosoma latahense, 6 Plectania milleri, 2 Fissidens pauperculus,* and 19 *Gelatinodiscus flavidus*) were also documented. Four of these tracking species also have Survey and Manage status; *Chaenotheca ferruginea* and *Gelatinodiscus flavidus* are Category B species, and *Chaenotheca subroscida* and *Leptogium rivale* are Category E species (Table 1-1).

Table 1-1. Bureau special status species, species status, general habitat, and number of occurrences in the Westside planning area.

Lifeform	Scientific name	Common Name	Status	Habitat	Occurrences in Planning Area vs in actual timber units
Fungi	*Gelatinodiscus flavidus*		BTO / S&M B	4	19 / 10
Fungi	*Plectania milleri*		BTO	1,4	5 / 5
Fungi	*Sarcosoma latahense*		BTO	1,4	6 / 6
Lichen	*Chaenotheca ferruginea*	Stubble lichen, pin lichen	BTO / S&M B	4	29 / 20
Lichen	*Chaenotheca furfuracea*	Sulphur stubble lichen	BTO	4	11 / 9
Lichen	*Chaenotheca subroscida*	Needle lichen	BTO / S&M E	4	1 / 1
Lichen	*Leptogium rivale*	Skin lichen	BTO / S&M E	1	4 / 0
Moss	*Crumia latifolia*	wideleaf crumia moss	BAO	1,2,4,7	1 / 0
Moss	*Funaria muhlenbergii*	Muhlenberg's funaria moss	BAO	2,3	2 / 0
Moss	*Fissidens pauperculus*	Poor pocket moss	BTO	1	2 / 0
Moss	*Hedwigia detonsa*	hedwigia moss	BTO	2,4,5	1 / 0
Vascular	*Clarkia heterandra*	Mountain clarkia	BAO	4,5	1 / 0
Vascular	*Cypripedium fasciculatum*	clustered lady's-slipper	BSO / S&M C	4	4 / 0
Vascular	*Cypripedium montanum*	mountain lady's-slipper	BTO / S&M C	4	7 / 3
Vascular	*Enemion stipitatum*	Siskiyou false rue anemone	BTO	5	1 / 0
Vascular	*LImnanthes gracilis var. gracilis*	Slender meadow-foam	BSO	3	4 / 0
Vascular	*Mimulus douglasii*	purple mouse ears	BTO	3	2 / 0

Habitat definitions: 1 = drainage, **2** = rock outcrops, **3** = meadows and open areas, **4** = coniferous forest, **5** = woodland, **6** = shrubland/chaparral, **7**=tufa deposits. Only a few populations (less than 10%) were found in those habitats enclosed in parenthesis.

Within timber harvest units, bureau sensitive and assessment species and survey and manage category C species would be protected by buffers, which would vary in diameter depending on unit prescription. Bureau tracking species do not require mitigation, and would not receive buffers. However, sites harboring tracking species which also have a S&M Category B or E designation would be managed. *C. ferruginea* and *C. subroscida* sites within units retaining more than 40% canopy closure would be managed by leaving their substrates intact. Per contractor reports, many of the *C. ferruginea* sites were noted to occur in close proximity (within 200-400 feet) to openings, indicating this species can persist in habitats with increased amounts of light. This finding was considered in the preparation of management recommendations of the Glendale Resource area Botanist, since no official management recommendations have been established. Those *C. ferruginea* sites within units retaining less than 40% canopy closure would be managed by substrate retention coupled with a 25 – 40 foot buffer to maintain the microhabitat.

Gelatinodiscus. flavidus and *L. rivale* sites would be managed by buffers similar to those delineated for sensitive and assessment sites. Sensitive and assessment sites residing in units retaining more than 40% canopy closure would receive a 100' buffer, while sites within units retaining less than 40% canopy closure would receive a 200' buffer. Given these protection measures, the proposed action would not trend these species toward federal listing and should assure persistence.

Sites within units slated for fuels treatments would be protected, but since the overstory is not typically affected by prescribed burning activity, and fire is a naturally-occurring disturbance, buffer sizes would be less. Buffers would vary from 5 to 30 feet in diameter depending on 1) the prescribed fuels treatment, 2) the time of year treatment would occur, and 3) whether or not that species has demonstrated a tolerance to fire-related disturbance. For instance, if a species such as *Camassia howellii*, which has consistently demonstrated a favorable response to introduced fire, is within a prescribed burn unit and the burn is scheduled for late fall or very early spring (when the plant is dormant), that population would not receive a buffer. Given these protection measures, proposed prescribed burning activity would not trend these species toward federal listing and should assure persistence.

Bureau Special Status Fungi – NOT AFFECTED

The Planning Area was not surveyed for fungi, as pre-disturbance surveys for Special Status fungi are not practical, nor required per BLM – Information Bulletin No. OR 2004-121, which states "If project surveys for a species were not practical under the Survey and Manage standards and guidelines (most Category B and D species), or a species' status is undetermined (Category E and F species), then surveys would not be practical or expected to occur under the Special Status/Sensitive Species policies either (USDA FS and USDI BLM, 2004, p.3)." Current special status fungi were formerly in the aforementioned S&M categories which did not consider surveys practical, and are therefore exempt from survey requirements. With the recent re-instatement of Survey and Manage Protocols, these species were placed back into their respective S&M categories (9 species in B, 1 species in F) – none of which require surveys under S&M protocol.

District wide, the Medford BLM has ten Bureau Sensitive (BSO) fungi species; six are suspected to occur here, while the remaining four have been documented. Of the four documented species, only one, *Phaeocollybia olivacea*, has been found in the Glendale Resource Area, approximately 1.75 air miles away from the Planning Area. Although this site and the Planning Area reside within the same HUC 5 Middle Cow Watershed, the microhabitat of the fungi site differs from the microhabitat of the closest Westside units. The west-facing riparian-influenced habitat surrounding the fungi site differs from the north-northeast-facing habitat of the closest Westside units, and, although this site was found by a highly qualified and respected botanist, the specimen was never officially verified by the regional mycologist.

Based on the outcome of utilizing the 'Likelihood of Occurrence Key' provided from the BLM Oregon State Office, there is a "low likelihood of occurrence and low risk to species viability or trend toward listing," for sensitive fungi species potentially located in the Planning Area. While it is possible that this project is occurring within potential habitat for some species, there is very little information available describing the *exact* habitat requirements or population biology of these species (USDA,USDI 2004 (2004 Final SEIS vol.1) p. 148). The 2004 FEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines addresses this type of incomplete and/or unavailable information (USDA, USDI 2004, pp 108-109). However, the *2004 Record of Decision* (ROD) *to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines*, offers a broad scale prospective of this current situation in stating, "Any discussion of risk based on rarity and likelihood of disturbance must recognize that, for many species, only a small percentage of potential habitat has been surveyed. Reserves have not been surveyed to the same degree as Matrix and Adaptive Management Area land allocations. The Reserves were not surveyed because there has been little management-induced disturbance there. The vast majority of pre-disturbance surveys have been located in the Matrix and Adaptive Management Area land allocation (19 percent of the northwest Forest Plan area), so that is where many of the known sites have been found. This does not mean that a disproportionate amount of their habitat is located in Matrix. If these species are truly closely associated with late-successional or old-growth forests (this is one of the criteria for inclusion in Survey and Manage) we can reasonably expect that the large amount of federally managed lands in Late-Successional and Riparian Reserves which provide the most amount of this type of habitat (86 percent of currently existing late-successional forests is in reserves) would also provide, at a minimum, its proportionate share of the habitat to support populations of these species (2004 ROD to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines, p.11)."

Based on the above information, the likelihood of a Bureau Sensitive fungi species in this Planning Area is very low; the likelihood of a sensitive fungi occurring within a single unit(s) encompassed in the Planning Area is even lower. The likelihood of contributing toward the need to list is not probable.

Alternative 1 – No Action

Direct and Indirect Effects

Special Status Vascular Plants
There would be no direct effects to Special Status vascular plants under Alternative 1 because no physical disturbance would occur that could impact them. However, under the No Action Alternative, stands identified as needing fuels reduction would remain overstocked, resulting in deterioration of stand health and reduced resiliency to disturbance events. In the event of wildfire, stands with high canopy cover and fuel ladders generally burn at higher intensity, potentially resulting in stand-replacement and greater damage to plants and soil. Under Alternative 1, the risk of damage to Special Status vascular plants from intense wildfire would remain unchanged from current conditions. Under Alternative 1, no timber harvest would occur in late-successional stands on BLM-managed lands. In the absence of fire, they would continue to provide habitat for late-successional associated Special Status vascular plants.

Special Status Nonvascular Plants
No direct or indirect effects would occur to Special Status nonvascular plants because no activities would occur that could impact them.

Special Status Fungi
There would be no direct or indirect effects to Special Status fungi under Alternative 1 because no physical disturbance would occur that could impact them if present. There would be no loss of late-successional forest which provides suitable habitat for the 10 Medford District BLM Sensitive fungi. However, as discussed under the effects of Alternative 1 to Special Status Vascular Plants, the potential for stand-replacing fires resulting from overstocked forests and subsequent risk of damage to Special Status fungi still exists.

Cumulative Effects
Information is not available about rare plant populations in the Westside Planning Area prior to BLM botanical surveys, which began during the last 25 years. However, past activities, described in the affected environment, likely affected Special Status plants and populations by damaging or destroying individuals or reducing or degrading suitable habitat.

Although specific logging plans for private industrial forest lands are not available, it is assumed that commercial harvest would occur in the future on relatively short rotations, and that privately-owned forests would remain in early to mid-seral stages. Special Status species do not receive protection on privately-owned lands, but would continue to be protected and conserved on federal lands, according to BLM policy and the Medford District RMP.

Alternative 1 would not contribute additional cumulative effects to Special Status vascular / nonvascular plants, or fungi. The amount of late-successional forest on BLM-managed lands would remain unchanged, in the absence of wildfire, and would continue to provide habitat for late-successional associated plants and fungi. Mid-seral stands would continue to develop toward a late seral stage. Current trends toward overstocking would continue as a result of fire exclusion. The potential for intense, stand-replacing fires and the risk of direct mortality or damage to Special Status plants or fungi or loss of suitable habitat from high severity wildfire would further persist from current conditions.

Alternatives 2 & 3

Direct and Indirect Effects

Special Status Vascular Plants

In Alternatives 2 and 3, special status plant sites reside in units proposed for timber harvest (Table 1-1). Prescriptions for harvest include regeneration harvest/group select and commercial thinning, accomplished by a variety of harvest methods such as tractor, cable and helicopter logging systems. Commercial thinning retains 40% canopy closure, while regen/group select systems retain 10-30% canopy closure. Protection measures for species requiring management are described in the Affected Environment. Establishing these site management measures would protect plants against potential direct and indirect effects, including:

- damage or mortality from logging equipment
- damage or mortality from heat or fire during post-harvest slash pile burning
- reduced population vigor or reproductive success or mortality from increased light, temperature, and reduced relative humidity when overstory trees are removed
- reduced population vigor or reproductive success or mortality as a result of breaking mycorrhizal connections and disrupting food cycling between conifers and plants when overstory trees are removed

Another potential indirect effect to Special Status vascular plants in the Planning Area as a result of harvest activities is the introduction or spread of noxious weeds. Weeds could spread during construction of temporary and permanent roads and during ingress and egress of equipment, particularly off system roads. Weeds compete with rare plants for space, water, light, and nutrients. Treating noxious weeds in the watershed, washing logging equipment before moving it onsite, and using native grass seed and straw in post-treatment restoration would reduce the risk of spreading noxious weeds that could impact Special Status vascular plant populations which prefer a similar environment.

Under Alternative 2 & 3, 1515 acres (Alt 2) or 1338 acres (Alt 3) of late-successional forest would be regeneration harvested. These stands currently provide suitable habitat for expansion of existing Special Status vascular plant populations or for establishment of new populations, but under Alternatives 2 and 3 they would not provide late-successional habitat for 80-plus years. Under both alternatives (1859 acres under Alt 2, 1671 acres under Alt 3) acres would be commercially thinned and would retain 40-60 percent canopy cover. Removing some trees would free up water, light, and nutrients, resulting in accelerated growth and resiliency in the remaining trees. After treatment of post-harvest slash, these stands would be less at risk of high intensity wildfire, resulting in less potential damage to Special Status vascular plants in the treatment areas in the event of wildfire.

Thirteen special status species sites (4 *Limnanthes gracilis var. gracilis,* 1 *Clarkia heterandra,* 4 *Cypripedium fasciculatum,* and 4 *Cypripedium montanum*) (Table 1-1) are located in proposed understory thin/handpile/burn units. The proposed prescription would remove some understory shrubs and trees, but would retain over-story conifers greater than 8 inches diameter. Because large conifer and hardwood trees would be left, the overstory canopy cover in the units would remain. No treatment buffers, ranging from 5 – 30 feet around the sites would protect plants against potential direct and indirect effects of the fuels reduction treatment, including:

- damage or destruction of above or below ground plant parts during handpile burning
- reduced population vigor or reproductive success or mortality as a result of increased light, temperature, and reduced relative humidity from removing understory trees and shrubs
- reduced population vigor or reproductive success or mortality if mycorrhizae connecting conifers and plants are damaged during handpile burning

Fuels reduction treatments would reduce the risk of high intensity wildfire in the treated stands, which would also reduce potential damage to Special Status vascular plants in the treatment units in the event of wildfire. Thinning dense, overstocked mid-seral stands would accelerate development of late-successional characteristics and improve stand health in those stands, making them more resilient to catastrophic damage from wildfire, insects or pathogens. Although Special Status plant sites would be buffered, burning handpiles in the surrounding areas would remove vegetation and open up areas for potential invasion by noxious weeds, which compete with Special Status vascular plants for light, water, and nutrients. Treating noxious weeds in the watershed in 2006 and using native plant material for post-treatment seeding and mulching would reduce the risk that noxious weeds would be introduced or spread during fuels reduction treatment.

Special Status Nonvascular Plants

Fifty-six assessment species sites (2 *Funaria muhlenbergii*, 1 *Crumia latifolia, 29 Chaenotheca ferruginea, 1 Chaenotheca subroscida, 4 Leptogium rivale,* and 19 *Gelatinodiscus flavidus)* (Table 1-1) were found during pre-disturbance surveys. Twenty-five of these sites reside in fuels treatment units, while thirty-one reside in timber management units.

Potential direct / indirect impacts and subsequent precautionary management measures taken to protect these species are similar to those outlined in the vascular plant section.

However, there are two main differences; the first is that noxious weeds do not pose as much of a threat to nonvascular species as they do to vascular species because nonvascular species grow on a variety of substrates which are inhospitable to vascular species. The second difference pertains to the management of two nonvascular S&M species – *Chaenotheca ferruginea* and *Chaenotheca subroscida*. Instead of receiving 100 or 200 foot buffers, *Chaenotheca. ferruginea* and *C. subroscida* sites within units retaining more than 40% canopy closure would be managed by leaving their substrates intact. Those *C. ferruginea* sites within units retaining less than 40% canopy closure would be managed by substrate retention coupled with a 25 – 40 foot buffer – creating a 'grouped' effect – to maintain the microhabitat. Per contractor reports, many of the *C. ferruginea* sites were noted to occur in close proximity (within 200-400 feet) to openings, indicating this species can persist in habitats with increased amounts of light. This finding was considered in the preparation of management recommendations since no official management recommendations have been established.

Since all *Chaenotheca* sighting reports delineate the specimen was attached to a large-diameter Incense Cedar, the aforementioned protection measures are suitable for fuels units as well as timber management units, as piles are typically placed away from tree trunks.

Special Status Fungi

No fungi surveys have been conducted in the Westside Planning Area, therefore, it is unknown if Sensitive fungi are present in the treatment units. Potential habitat for all 10 Sensitive species exists in the Planning Area because both Douglas-fir and white fir components are present, but predicting their presence is difficult because the habitat requirements are poorly understood. Because of their rarity across the Northwest Forest Plan area, it is unlikely that populations are present in the treatment units. However, if present, they could be directly or indirectly adversely impacted by the proposed actions in Alternative 2.

Harvest can have varying degrees of adverse impacts on fungi, depending on the level of tree removal and ground disturbance. Removing, disturbing, or compacting the top layer of organic material and mineral soil could negatively impact fungi. The main and most extensive part of the fungus consists of a below-ground mycelia network that resides in the top few inches of mineral soil. Mycelia networks are often connected to multiple trees through their root systems. In one study, fungal mycelia networks ranged in size from 1.5 - 27 square meters (Dahlberg and Stenlid 1995). Disruption of mycelia networks could occur during timber harvest, construction or ripping of roads or landings, removal of host trees that sustain the ectomycorrhizae, or burning post-harvest slash piles. The effect of these activities on fungi is a loss of species diversity and abundance (Amaranthus et al. 1996). Alternative 2 presents the greatest potential risk of impacting Special Status fungi, if present, because it proposes the most miles of temporary and permanent roads and the most acres harvested.

Fungi could also be directly impacted from radiant heat during burning of post-harvest slash piles. Effects of pile burning include damage or death of mineral soil fungi including the mycelia and spores; loss of litter, organic matter and large wood, resulting in reduced moisture retention capability; loss of nutrient sources; and changes in fungal species diversity and abundance. Implementation of Alternative 2 creates the greatest threat of damage to fungi from burn piles because the most acres would be harvested. Regeneration harvest produces more slash than select cut or commercial thin treatments and more area would be impacted by burn piles.

Fuels reduction treatments present a trade-off of potential beneficial and adverse effects to fungi when their presence in the treatment areas is unknown. On one hand, reducing tree densities and ladder fuels reduces the potential for high intensity wildfire which causes greater impacts to fungi than less intense fire. On the other hand, burning handpiles creates a risk to fungi of damage to mycelia and spores if they occur beneath or adjacent to the handpiles. Fungi could also be indirectly affected by changes in environmental conditions resulting from thinning mid-story and understory trees and shrubs. Alternatives 2 and 3 would reduce hazardous fuels on 4,362 acres in Alt 1, or 3,997 acres in Alt 2.

Cumulative Effects

Information is not available for rare plant populations in the Westside Planning Area prior to BLM botanical surveys, which began during the last 25 years. However, it is assumed that past activities, described in the affected environment, likely affected Special Status plants and populations by damaging or destroying individuals or reducing or degrading suitable habitat.

Although information is not available for logging plans on private industrial forest lands, it is assumed commercial harvest would occur in the future and privately-owned forests would be in early to mid-seral stages. Special Status species do not receive protection on privately-owned lands, but would continue to be protected and conserved on federal lands, according to BLM policies and federal regulations.

Special Status plants would not be directly impacted by the activities proposed in Alternative 2 or 3 because surveys have been conducted and Sensitive and Assessment plant sites would be protected. Project design features would reduce the risk of introducing or spreading noxious weeds during project implementation, which could potentially impact Special Status vascular plants. No Special Status vascular or nonvascular plants would trend toward listing as a result of implementing the activities proposed in Alternative 2 or 3.

The only cumulative effect to Special Status vascular and nonvascular plants added under Alternatives 2 and 3 would be the reduction of late-successional forest which provides suitable habitat for expansion of existing populations or establishment of new populations of late-successional associated species.

The potential cumulative effect of the proposed projects on Sensitive fungi would be the risk of impacting rare populations on 3374 (Alt 1) plus 988 (fuels treatments) or 3009 (Alt 2) plus 988 (fuels treatments) acres during timber harvest and fuels reduction treatments. However, the proposed harvest would occur on matrix lands, which are designated for timber production and harvest. Across the Northwest Forest Plan area, approximately 14 percent of the 8 million acres of late-successional forest are in matrix and are available for harvest, while 86 percent are designated as late-successional reserves, congressionally reserved and administratively withdrawn areas, and riparian reserves. It is estimated that over the next 50 years, late-successional forest would develop at 2.5 times the rate of loss through stand-replacement fires and harvest (USDA, USDI 2004, 109-111). This reserve system spread across the landscape is intended to provide protection and development of late seral habitat for the protection and expansion of late-successional associated rare plants. Under the Northwest Forest Plan, at least 15 percent late seral (80-plus years old) conifer forest must be maintained in each 5th field watershed (USDA, USDI 1994, p. C-44). Because of their rarity across the Pacific Northwest Forest Plan Area, it is unlikely Sensitive fungi are present in the Westside timber harvest or fuels reduction units. The risk is low that they would be impacted. The assumption is made that protecting known sites (current and future found) of these Sensitive fungi, in addition to conducting large-scale inventories throughout the Pacific Northwest, would be adequate in ensuring that this project and future projects would not contribute to the need to list them (USDI 2004, 5-2).

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Likihood of Occurrence Key:
http://www.or.blm.gov/isssp/Tools/20050112/Sept_7_2004_final_tools_key.doc

APPENDIX 10 SPECIALIST REPORT- MIGRATORY BIRDS

To: Katrina Symons, Field Manager, Glendale Resource Area
From: Marylou Schnoes, Wildlife Biologist, Glendale Resource Area
Re: 'Not Affected' rationale regarding migratory birds
Date: 30 August 2006

Analysis of Proposed Action Effects on Birds of Conservation Concern
for
Westside Landscape Planning Environmental Analysis
EA # 0R-118-05-021
Middle Cow LSR Planning Project Environmental Analysis
EA # 0R -118-05-022

Compliance with the Executive Order To Protect Migratory Birds
Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds," (Federal Register 2001) highlights the need for federal agencies including the U.S.D.I. Bureau of Land Management (BLM) to conserve migratory birds (those species listed in 50 C.F.R. 17.11) (U.S. Fish and Wildlife Service 2002) protected by the migratory bird conventions (the Migratory Bird Treaty Act [16 U.S.C. 703 – 711], the Bald and Golden Eagle Protection Acts [16 U.S.C. 668 – 668d], the Fish and Wildlife Coordination Act [16 U.S.C. 661 – 666c], and the Endangered Species Act of 1973 [16 U.S.C. 1531 – 1544. This responsibility includes the need to ensure that environmental analysis of federal actions evaluate the effects of those actions on migratory birds, "with emphasis on species of concern" (Federal Register 2001, p.3855).

"To the extent permitted by law and …in harmony with agency missions" (p.3854, Ibid.) such as the O&C Act of 1937, the Medford District Resource Management Plan (U.S.D.I. 1995) and the Northwest Forest Plan (U.S.D.A./U.S.D.I. 1994a); the proposed actions are consistent with "avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources," (p. 3854, Federal Register 2001) as directed in the Executive Order mentioned above.

Birds of Conservation Concern.
Table 1 below summarizes the potential effects of the proposed actions described in the Westside Landscape Planning Environmental Analysis and Middle Cow LSR Planning Project Environmental Analysis on the Birds of Conservation Concern known to occur on Medford District BLM managed lands.

Table 1: Birds of Conservation Concern for Medford District BLM		
species	**habitat** (Kemper 2002)	**presence in Westside Project Area and effects**
peregrine falcon	cliffs	Unknown, habitat not present in project area
flammulated owl	ponderosa pine forests with closed overstory and open subcanopies	Unknown, habitat not present in project area
olive-sided flycatcher	green coniferous forests with snags	Present in project area. Habitat present. Habitat is relatively broken-canopied coniferous forest from sea level to Cascades up to 9,000' elev., containing large trees and snags (Zeiner et al 1990). Geographic distribution over W side of CA, OR, WA, intermountain West and most of Canada (Natl. Geographic 1989). Suitable medium and large conifer habitat would persist in Congressionally (Wilderness and National Parks) and Administratively (lands unsuitable for timber harvest) Withdrawn Lands, which total over 2.25 million acres (FEMAT 1993, Table IV-3) plus 100-acre owl cores (over 100,000 ac.[U.S.D.A./U.S.D.I. 1994]); marbled murrelet LSRs; riparian reserves (630,000 ac [Ibid.]); and some forested lands in the following land allocations W of the Cascade crest: Mapped LSRs, many state parks; military installations, and national and state wildlife refuges. Individual home range is approximately 20 ac. (Johnston 1971 *In* Zanier 1980). Therefore, the proposed actions would have no measurable effect on population trends at a state or regional scale.
rufous hummingbird	Foraging habitat: Early successional stages with flowering plants. Nesting habitat: Shrubs and trees near foraging habitat.	Present in the Project Area. Foraging habitat present over less than 10% of areas within timber harvest units, as units are forested and not in early successional stages. Fuels units are dense with woody vegetation, and thus contain relatively little early successional habitat and nectar-producing vegetation. Earlier successional stages and therefore, new foraging habitat would be created by proposed action over most acres in units for at least 10 years. Nesting habitat is present in some edges of units. Some nesting habitat near edges within units would be removed. But since nesting habitat suitability depends on the proximity of trees and shrubs to foraging habitat, it is likely that the proposed action would result in more woody vegetation being in close proximity to hundreds of acres of newly created foraging habitat. Thus, these actions would indirectly create more potential nesting habitat for at least 10 years; over several hundred acres. However, since habitat for this species is very widespread (in suburban and forested areas of NW CA, the NW 2/3 of OR and ID, all of WA and over half of BC), population trends at state or regional

		levels would not be affected by proposed actions.
Lewis' woodpecker	ponderosa pine stands	Unknown, habitat not present in project area
white-headed woodpecker	large ponderosa pines, rarely true fir stands	Unknown, habitat not present in project area

Species with "Unknown" Presence.
The four species with "unknown" presence are birds that are considered rare in all of southwest Oregon, have extremely specialized habitat requirements and whose nesting habitat is not likely to occur in the project areas. Only the peregrine falcon would be expected to pass through the project area. Such use would be ephemeral, as hunting forays and would not likely be affected to any observable level by the proposed actions or post-action changes in habitat.

Because there would be no observable impacts on the use they may be making of the project areas, the proposed actions would not affect the populations of these migratory Birds of Conservation Concern.

Species Present in the Project Area.
The olive-side flycatcher is known to use older (mature and old-growth) coniferous stands or fragments of these with uneven, mixed-age canopies that contain occasional snags, from which it forages (Csuti et al 2001, Kemper 2002, Altman 1999). Such stands are found in the proposed actions and their suitability would be affected by the proposed actions. However, considering the large amount of habitat suitable for the species, found in the region (listed in Table 1); the partial, listed acreage of which totals approximately 3 million acres; the population trends at state and regional levels would not be affected by proposed actions.

The rufous hummingbird forages on nectar-producing flowers, which occur in early successional areas. Within the project areas, these occur mostly outside the heavily forested proposed units. The proposed actions would create new foraging habitat within sale and fuels units. Nesting habitat for this species is in woody vegetation in close proximity to foraging habitat. Because the proposed actions would create hundreds of acres of new foraging habitat, which would be in close proximity to woody vegetation, the proposed actions would indirectly create more nesting habitat than existed before project were implementation. However, since the forest would gradually recover and progress to a purely forested condition, units would eventually revert to non-habitat conditions. The time required for such succession would vary with the silvicultural prescription (e.g., regeneration harvest vs. group select cut) and individual characteristics of the stand (e.g., soil type, aspect). All treated stands would be expected to provide some early successional habitat containing nectar-producing plants for at least ten years. However, such changes would not be expected to affect population trends at the state or regional level.

Regional Strategies.
Both the U.S.D.I. Fish and Wildlife Service (2002) and Partners in Flight (Altman 1999) consider the state and regional approach a key to the conservation of migratory songbirds.

In 1999, strategies for the conservation of the olive-sided flycatcher and the rufous hummingbird and other species were proposed in the form of a regional conservation plan for coniferous forests in Oregon and Washington. This strategy, which "represents the collective efforts of multiple agencies and organizations within …Partners in Flight," recognized the Northwest Forest Plan as an effort in the same type of conservation planning process, which approaches management at a regional level. The proposed actions are consistent with the Northwest Forest Plan, which is also designed to provide for the conservation of other forest-related species in the range of the Northern Spotted Owl, such as these songbirds.

Within the Northwest Forest Plan (24,455,300 federal acres), reserved/ withdrawn lands total approximately 78% of the federal land base (USDA/USDI 1994, p. 2-62:65). Not all of the reserves are in or will obtain late-successional forest conditions, but the majority is expected to contribute as suitable habitat towards migratory birds utilizing late successional habitat. In addition, Matrix lands (3,975,300 acres) representing about 16% of the federal land base, contain selected portions of the land managed to retain 15-30% in late-successional forest, which provides additional suitable habitat.

Allocation	**Acres**	**%**
Congressionally Withdrawn	7,321,000	30
Late Successional Reserves	7,431,000	30
Riparian Reserves	2,628,000	11
Administratively Withdrawn	1,477,000	6
TOTAL	**18,857,000**	**77**
Matrix land	3,975,300	16

Projects occurring within Late Successional Reserves are subject to review by the Regional Ecosystem Office to ensure that the treatments are beneficial to the creation of late-successional forest conditions. The Middle Cow LSR Planning Project Environmental Analysis meets the intent of the Medford District RMP to manage late-successional reserves to "enhance and/or maintain late-successional forest conditions" (USDI 1995, p.21) and would not negatively effect the population trends at state or regional levels.

Compliance with the Migratory Bird Treaty Act.
This act implements various treaties and conventions between the U.S. and other countries that share migratory flyways. With this proposed action, and as prohibited in the Act, there would be no deliberate take, possession, import, export, transport, sale, purchase, barter or offering of these activities, or possessing migratory birds, including nests and eggs.

Summary
The implementation of the proposed actions is not expected to affect the trend in populations of migratory birds, as established at a state or regional scale. Also, the proposed actions are consistent with planning documents designed to conserve songbirds at those scales.

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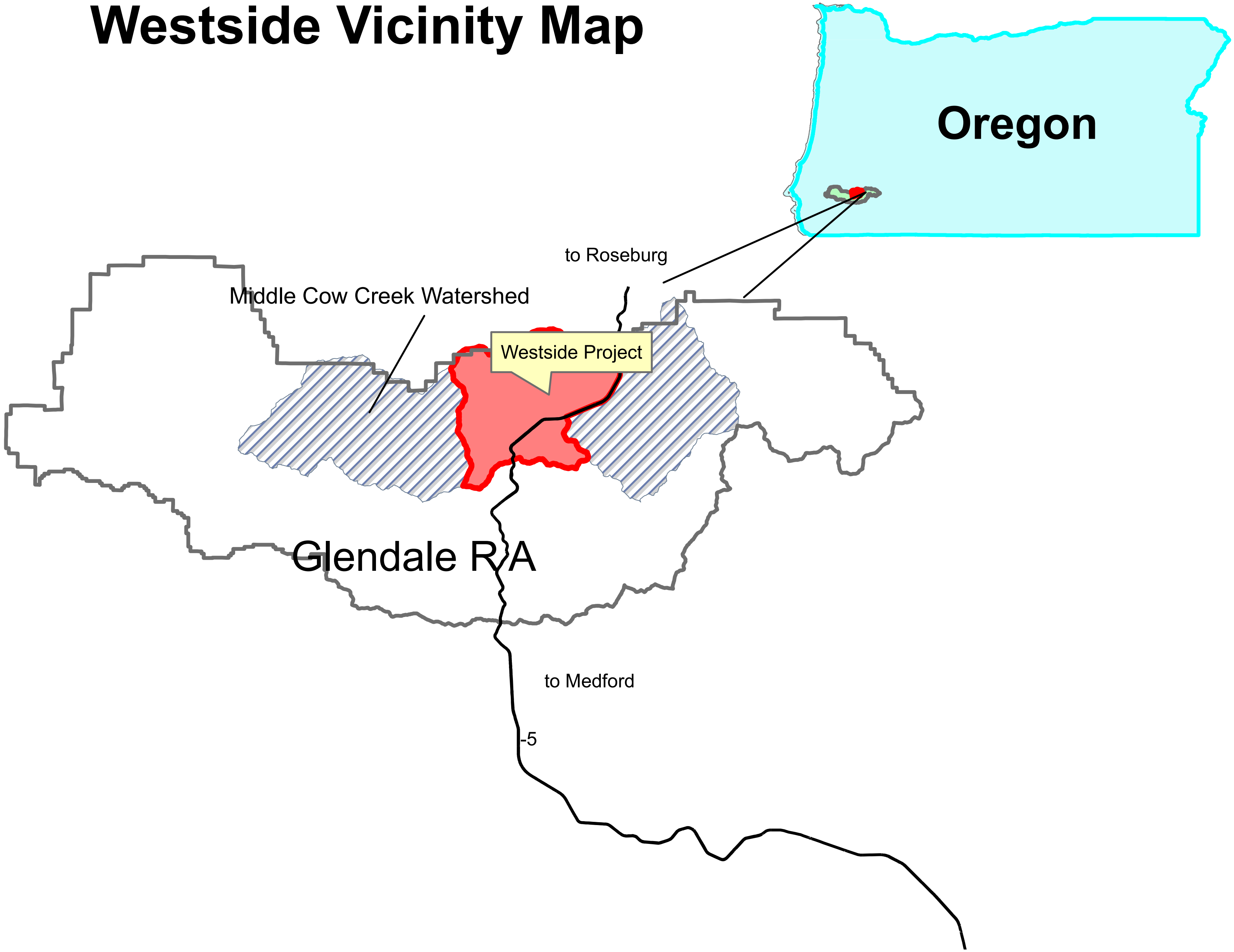
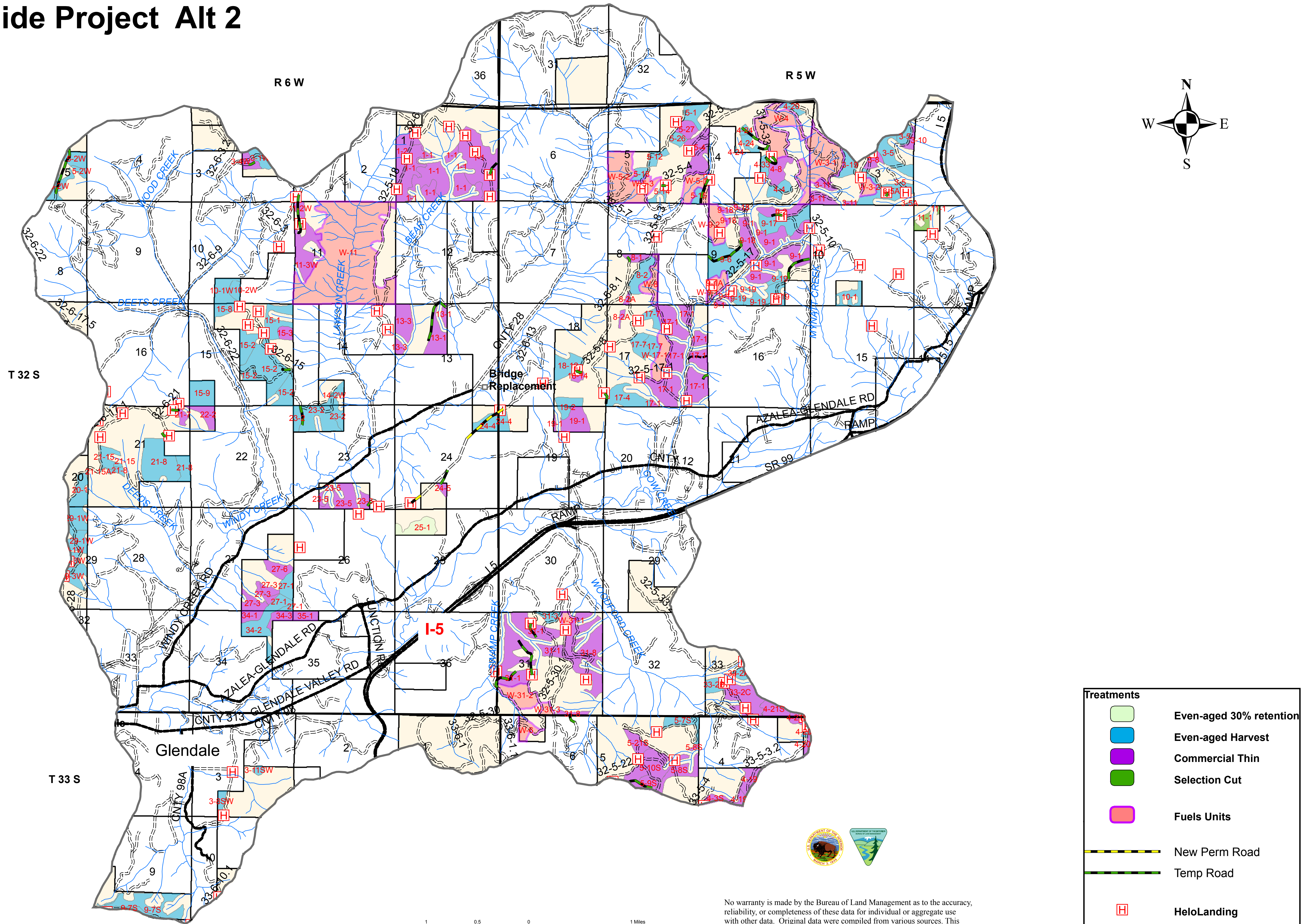
MAPS

Westside Vicinity Map



Westside Project Alt 2



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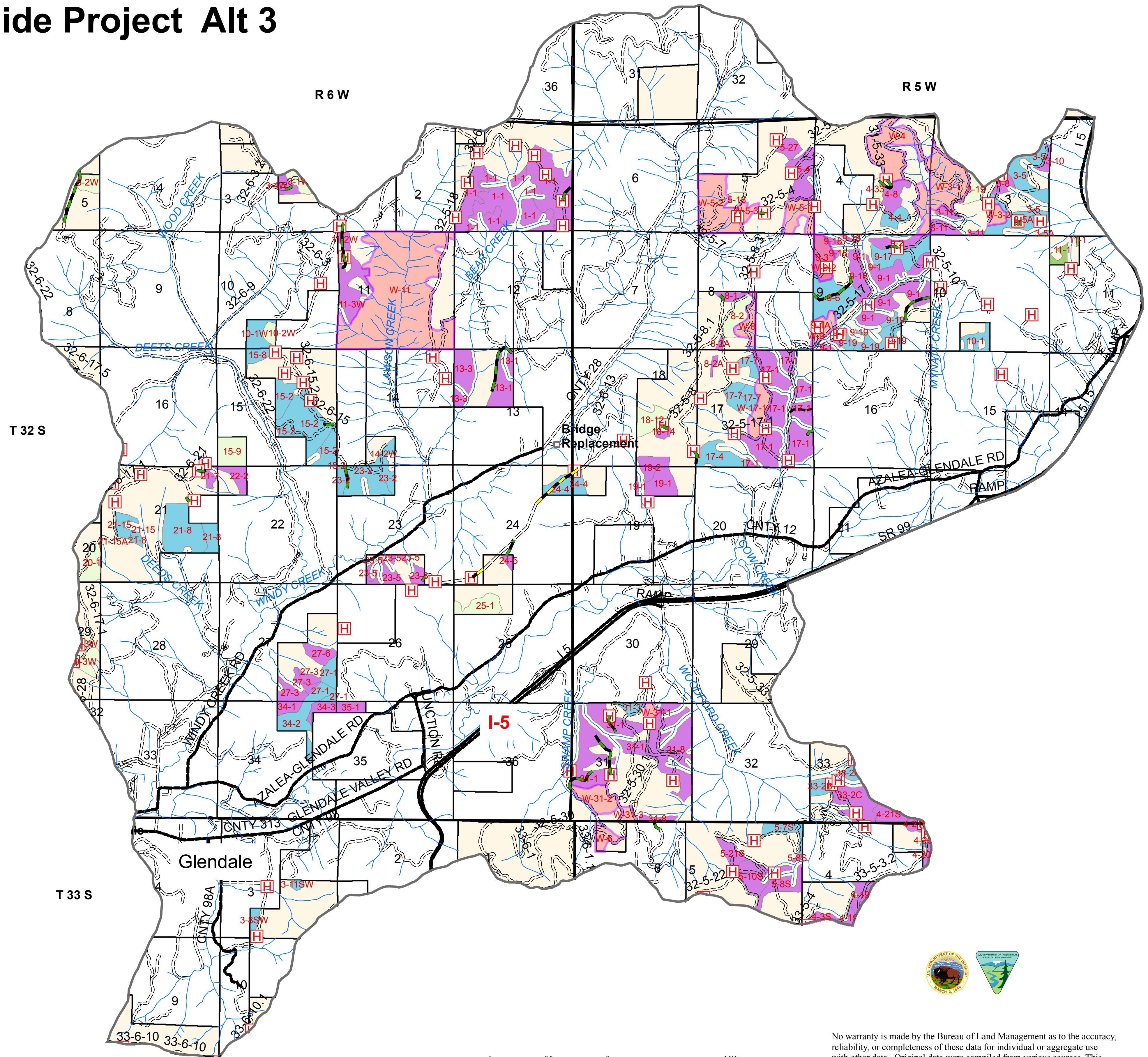
Westside Project Alt 3



Treatments

- Even-aged 30% retention
- Even-aged Harvest
- Commercial Thin
- Selection Cut
- **Fuels Units**
- **New Perm Road**
- **Temp Road**
- **HeloLanding**
- **BLM**

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